

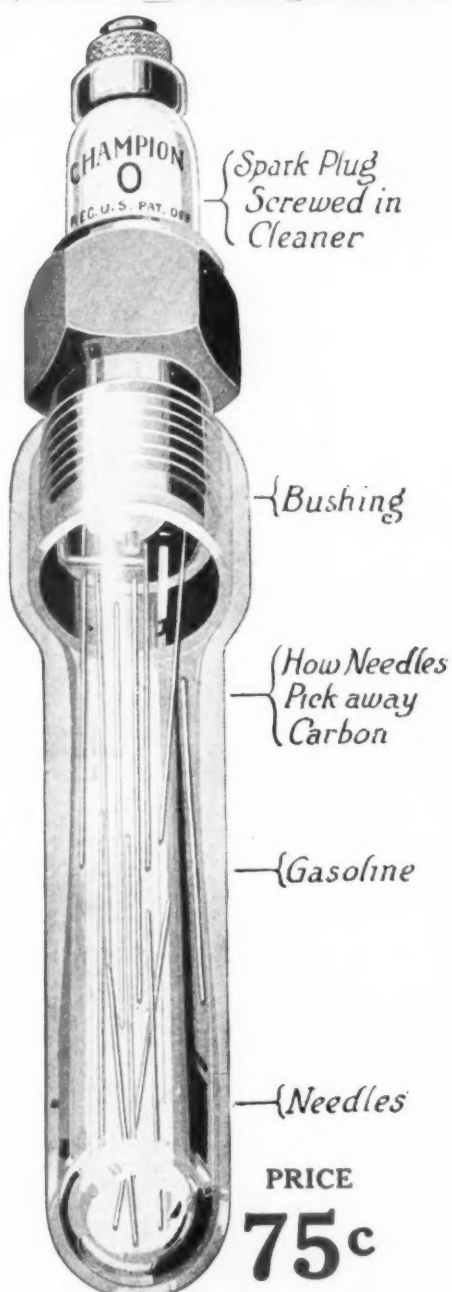
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The AUTOMOBILE

Vol. XXXVI
No. 19

NEW YORK, MAY 10, 1917

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The AUTOMOBILE

VOL. XXXVI

NEW YORK—THURSDAY, MAY 10, 1917—CHICAGO

No. 19

Industry Made Tax Target

¶ Ways and Means Committee Singles Out Automobile, Truck and Tire Industries for 5% Tax.

¶ Kindred Industries Not So Taxed.

¶ The Industries Must Unite in Opposing this 5% Tax in the House, in the Senate Finance Committee and in the Senate.

¶ Senate Finance Committee Will Hold Open Hearings on the Measure.

¶ Manufacturers' Delegations Should Appear Before this Committee as Well as Waging a Fight on the Floor of the House and also in the Senate.

I—The 5 Per Cent Tax—"Upon all automobiles, automobile trucks, automobile wagons, and motorcycles, and automobile, motorcycle or bicycle tires (including inner tubes) sold by the manufacturer, producer, or importer, a tax equivalent to 5 per centum of the price for which so sold, provided that from the tax which otherwise would be imposed on a manufacturer, producer, or importer of automobiles, automobile trucks, automobile wagons, or motorcycles, there shall be deducted the amount of any tax imposed by this subdivision upon the tires used thereon."

II—Why not here?—"Upon all yachts, pleasure boats, motor-boats, and other vessels NOT USED OR INTENDED TO BE USED FOR TRADE."

WASHINGTON, May 9—As anticipated, the 5 per cent tax to be paid by automobile manufacturers on the selling price of automobiles and trucks has been recommended by the Ways and Means Committee of the House. The committee has gone further than expected in that it has included motorcycles and "automobile wagons," which are apparently taken to mean trailers. The committee has gone still further in its proposed plan of extracting from the automobile industry by levying this tax against tires and

inner tubes to be used on automobiles, motorcycles or bicycles.

The automobile industry has been singularly picked out from all other manufacturing industries of a kindred class and made the target of this 5 per cent manufacturers' tax. The only other industry is that of yachts, pleasure boats and motor boats, but here the clause is inserted that the tax does not apply on these if they are to be used for trade purposes.

In the automobile industry there is no such discrimination applying to vehicles to be used for trade pur-

poses. They are all to be taxed alike, whether for trade or pleasure. It cannot be understood how the Ways and Means Committee should arrive at such an impossible conclusion.

Motor trucks are intended solely for trade use, yet they are put in the classification of the 5 per cent tax. On the other hand, motor boats intended for trade are exempt from the tax. We would like the Ways and Means Committee to answer why.

We would like to know why automobiles, trucks, trailers and mo-

motorcycles are taxed when no tax is placed on horse vehicles intended for pleasure uses, and when no tax is placed on horse vehicles engaged in trade the same as motor trucks, trailers and hundreds of thousands of automobiles and tens of thousands of motorcycles.

Glaring Discrimination

There could be no greater case of glaring discriminatory war taxation. There is no more right to tax a motor truck trailer than to tax a barge that is towed down the Hudson or the Mississippi or on any of our inland waterways.

There is no more right to tax a motor truck than to tax any canal boat.

There is no more right to tax a motor truck or trailer than to tax any of the railroad freight cars.

If you are going to tax motor trucks and truck trailers and automobiles and motorcycles used in trade then you must tax Pullman railroad cars, railroad passenger cars, steamboats, aeroplanes, horse vehicles for passenger and freight use, and other kindred forms of transportation.

We cannot understand how the Ways and Means Committee overlooked taxing farm tractors. They must not have been aware of the fact that we have 35,000 in use, or it may be that they were afraid of the farmer vote.

It is now squarely up to automobile manufacturers to fight this discriminating 5 per cent tax to the last.

It is up to every automobile dealer, garageman, and repairman to oppose this measure through his Congressman and through his home Senator.

It is up to every truck owner to give his entire opposition to this measure through the same channels.

Every automobile owner, whether his car is used for passenger work or trade, should oppose this discriminating measure.

Write to the Senate Finance Committee listed on the opposite page, protesting against this unjust tax!

Write to your Senator listed on page 896!

Do it to-day or your influence may be lost!

What passenger-car owner can sit still and allow his vehicle to be taxed when he sees the pleasure yacht and the pleasure motor boat of his neighbor let go without taxation?

What automobile owner to-day will be content to see the horse carriage,

5 Per Cent Tax Routine

NOW that the Ways and Means Committee at Washington has given its report on the tax, the work of revising the tax will pass through the following three stages, in each of which the automobile industry and every automobile truck and motorcycle owner will have an opportunity of using his or her influence against the measure.

Stage 1—The bill, as drafted, goes to Congress, where it is expected there will be a long fight on the floor due to its various provisions. This gives the automobile industry and owners an opportunity of aiding in the fight by writing or wiring their Congressman. Do this at once. Suggest to your Congressman or Senator that the industry should not be singled out, and that it does not object to paying its equitable share of war taxation.

Stage 2—From the House the measure as revised will go to the Senate Finance Committee. This committee will hold hearings on the measure which will give the automobile industry an opportunity of presenting its many reasons against this discriminatory tax. Every automobile and truck owner can co-operate with dealers in this protest by telegraphing or writing members of this Committee.

Stage 3—From the Senate Finance Committee the measure as revised will go to the floor of the Senate, where there will be good opportunity for prolonged debate and where the industry can make itself heard. Senators are generally more amenable to facts than the members of the House. It may be necessary unless the bill is satisfactorily revised before reaching the Senate to wage a more urgent campaign than in the House.

the horse cab, the horse hansom, etc., go without taxation, and know that his more modern automobile is taxed?

What automobile owner can afford to let such discriminating taxation be directly placed on him when he realizes that the horse delivery wagon of his grocer goes without taxation, whereas the more up-to-date Ford delivery of the rival grocer must be taxed?

The ramifications of this 5 per centum tax on motor apparatus are entirely too universal to let the measure, with this clause, get through the House of Representatives.

This 5 per cent measure must be defeated on the floor of the House. It can be defeated there by automobile, truck, trailer, motorcycle and tire manufacturers uniting as one phalanx of desperately earnest business men fighting for their same rights that we as a nation are fighting for in the

present war against the Central Powers. The issues involved in each case are in essence the same.

The automobile industry stands for democratic taxation, taxation of all alike. If every type of transportation has to be taxed, then tax it proportionately and the automobile industry will bear its share but you cannot expect the automobile industry to accept this class taxation when other industries of kindred natures are not taxed. Such a taxation policy is not democratic, it is not twentieth century war taxation, it is rightly described as autocratic mediaeval taxation.

The automobile, motorcycle, truck, and tire industries are content to pay their excess profit taxes as suggested in the draft by the Ways and Means Committee, namely, a 16 per cent tax. They have no complaint against such taxation. They have no complaint against any equitable taxation. They are willing to bear their due share of the \$2,000,000,000 war taxes that must be raised each year; but as faithful citizens of democracy they rightfully rebel against such discrimination as the 5 per cent tax involved.

It is difficult to understand why the tire industry has been selected as the one accessory industry to be inflicted with this 5 per cent tax, excepting in that it offers a possible source of greater revenue than any of the other accessory lines. Tires constitute a large cost of operating automobiles and trucks and this appears to be the only reason why they have been selected.

The 5 per cent tax against transportation of oil by pipe lines will affect the automobile industry but opposition cannot be raised to it as it affects all other industries alike.

There are several other ways in which the automobile industry will have to share its burden of war taxes. For example, there is a 3 per cent tax on the amount paid for all freight by rail or water, there is also a 10 per cent tax for express by rail or water. Both of these taxes will have to largely be shared by the consumer and the dealer.

As stated in THE AUTOMOBILE last week, the automobile manufacturer can scarcely hope to pass the 5 per cent tax on to the consumer, due to the fact that automobile prices have increased approximately 25 per cent in the last 8 months. With the consuming market somewhat depressed, this is no time to add an additional tax on the consumer by way of increasing the price.

Packard Employees Aid Red Cross

DETROIT, May 5—More than 75 per cent of the 9000 employees of the Packard Motor Car Co. contributed \$8,824 to the fund of the Detroit Chapter of the Red Cross. This is the largest single contribution received by the Detroit chapter.

DETROIT, May 5—The Detroit Auto Products Co. is now located in its new factory in this city where it will manufacture many of the products used on its Ford body equipment which it recently bought from other manufacturers.

Hearing on Tax May 12

Senate Finance Committee to Hear Single Representative of Industry at Capitol

WASHINGTON, May 9—*Special Telegram*—The automobile industry will be given an opportunity to be heard in opposition to the 5 per cent tax. It has been definitely settled that Saturday, May 12, at 10 a. m. there will be a hearing before the Senate Finance Committee at the Capitol. At that time an oral argument for the entire industry will have to be presented by a single representative to be agreed upon in advance by the manufacturers. Not more than 1 hr. will be allowed for the oral presentation. A written brief may be filed not later than Tuesday, May 15.

Yesterday, when the matter of the 5 per cent tax was being considered before the Ways and Means Committee of the House, Congressman Sicks of Indiana moved to have the tax reduced from 5 to 3 per cent, but was voted down by a fourteen to seven vote.

630 New S. A. E. Members

NEW YORK, May 9—The new membership campaign of the Society of Automotive Engineers is gradually reaching the 1000 mark, its goal. To date 630 applications for membership have been received, of which forty-one were received this week. The list has jumped from 484 in 1 week, an increase of practically 200. Should this rate of increase be kept up or bettered, it is possible that the 1000 mark will be reached by the end of May.

Michigan Congressmen Oppose Tax

DETROIT, May 8—Congressmen Nichols and Doremus of Detroit and Congressman Kelley of Lansing are vigorously opposing the 5 per cent tax.

The majority of the Congressmen at Washington have been under the impression that the automobile industry is so localized in the point of manufacture that it could be assailed with heavy taxes without causing an outburst from "injured constituents." They are finding this viewpoint erroneous. Makers of accessories in New England and the central States along the Atlantic and in other sections, and dealers from all points throughout the country are bombarding their Congressmen with warnings that it will not be Detroit and Michigan alone that will suffer if the motor car industry is placed under the burden of the 5 per cent tax.

Congressman Kelley in a discussion yesterday with Congressman Fordney of Saginaw, the ranking Republican member of the Ways and Means Committee, pointed out that it is not only unfair but unwise from a revenue gathering viewpoint to tax any industry beyond its limit, since this will result in no revenue at all. He further showed that the increased corporation tax is going to fall

on the motor companies as well as on other industries, that the excess profit tax which is to be raised to 16 per cent above 8 per cent will fall as does the special 5 per cent tax on gross income. Congressman Kelley suggested that the motor car companies be at least granted the same immunity as other industries on profits up to 8 per cent.

Senator William Alden Smith yesterday read in the Senate the protest of Governor Sleeper and the Detroit Board of Commerce against destroying the motor car industry.

Governor of Michigan Objects to 5 Per Cent Tax

DETROIT, May 7—Governor Sleeper has telegraphed to every Michigan member of Congress a request that he protest most vigorously against the proposed 5 per cent tax on automobile purchase prices and has requested Congressman Fordney, a member of the house ways and means committee, to make a minority report. This action followed a conference between the governor and R. E. Olds, president of the Reo Motor Car Co. of Lansing. Mr. Olds stated that a 5 per cent tax on the purchase price was a 40 per cent tax on profit and would mean the closing of many factories and the curtailment of work in many others. He also pointed out that Henry Ford was the only automobile maker in Michigan who would not be hit by the tax. Ford, according to Mr. Olds, has in his contracts for this year a clause which makes all government taxes payable by the agent and not by the maker. The governor's telegram to Congress was as follows:

"Michigan most emphatically protests against the proposed tax on automobiles, which, if adopted in its present form, will threaten the very life of the State's most important industry. We are willing to give of our men, our wealth and our vast resources, but we feel that the proposed measure discriminates against Michigan in a most unjust and unwarranted manner.

"A great majority of the automobile institutions are doing business on a very small margin of profit, and if the factories are taxed beyond reason the workmen who are dependent for their livelihood upon the automobile industry will be forced out of employment.

"Michigan is willing to bear her share of the great burden imposed by the war, and we believe the people of the country will give a square deal in this matter. I therefore urge you to use all honorable means against the proposed 5 per cent tax on automobiles."

Write to This Committee!

Finance Committee of the Senate:

F. McL. Simmons.....	North Carolina
W. J. Stone.....	Missouri
J. S. Williams.....	Mississippi
Hoke Smith.....	Georgia
Charles S. Thomas.....	Colorado
William Hughes.....	New Jersey
Ollie M. James.....	Kentucky
Thomas P. Gore.....	Oklahoma
A. A. Jones.....	New Mexico
Peter G. Gerry.....	Rhode Island
Boies Penrose.....	Pennsylvania
H. C. Lodge.....	Massachusetts
P. J. McCumber.....	North Dakota
Reed Smoot.....	Utah
J. H. Gallinger.....	New Hampshire
Robert M. LaFollette.....	Wisconsin
C. E. Townsend.....	Michigan

N. A. C. C. Fights 5% Sales Tax

General Manager Reeves in Washington with Brief on Industry's Condition

WASHINGTON, May 9—The National Automobile Chamber of Commerce, Inc., through its general manager, Alfred Reeves, is using every influence to properly present the side of the automobile industry to political Washington, with reference to the 5 per cent tax. Mr. Reeves is at present in the city and has with him a brief addressed to the members of Congress setting forth important facts with regard to the automobile industry showing why the 5 per cent tax is discriminatory.

His brief shows that of 450 automobile makers, twelve produce 80 per cent of the automobiles, leaving the remaining 20 per cent to be produced by 438 makers. Political Washington estimates the entire industry by a few of the leading companies, perhaps the twelve which make 80 per cent of the industry, rather than the 438 others which produce only 20 per cent of it.

The brief goes on to show that the industry has had to face a 25 per cent increase for labor and a still higher increase for materials. Some materials have increased as high as 400 per cent. Forgings so generally used are 85 per cent higher. Stampings also in great demand are 75 per cent higher, bearings are 35 per cent higher; steel tubings 40 per cent; sheet steel 65 per cent; and other materials in like ratio. The brief sets forth that the manufacturers cannot hope to pass this tax onto the consumer. It closes with a statement that the industry has already suffered curtailment through the declaration of war and that the Government should not by its taxation scheme endeavor to cripple an industry. The complete brief follows:

TO THE MEMBERS OF CONGRESS:

"Automobile manufacturers without exception desire to pay their full fair proportion of the Government's expense. They want to be taxed fully and in proportion to all other industries.

"They do object to having double taxation imposed upon them, or any form of taxation that may put dozens of them out of business.

"There are 450 automobile makers in the United States of which 12 makers produce 80 per cent and 438 produce 20 per cent of the whole. The 12 have been prosperous while the bulk of the others are able to exist only in good times. The prosperity is due to increasing volume, the reverse occurs when the volume shrinks.

"Since war was declared the volume of sales has been seriously affected. This condition continued will change the volume and hence the profits.

"To further and individually tax an industry with such a condition existing is unfair and unjust. Such a tax would

have to be absorbed by the maker. Any advance on a declining market would further restrict sales and hence volume.

"This condition would most seriously affect the small and the financially weak companies."

"This industry has been obliged to increase its costs for labor 25 per cent and material more, as indicated in the appended list. These costs have been overcome to some degree only by the great volume."

"These increases were:

Sheet aluminum	40%
Steel castings	30%
Bearings	35%
Aluminum castings	50%
Leather	30%
Stampings	75%
Sheet steel	65%
Tungsten steel	400%
Steel tubing	40%
Iron castings	35%
Forgings	75%

"The automobile industry comprises approximately 450 manufacturers and 825 makers of parts and accessories. There are 25,924 dealers and 23,686 garages throughout the country, all depending on the products of the makers of motor cars."

"Few of the 450 manufacturers are, we believe, averaging to exceed 12 per cent profit on their turnover. The 5 per cent tax would, therefore, take 5/12 of their profits (assuming the tax cannot be passed on to the consumer) which would equal 5/12 or 41.6 per cent of the profits of the trade as a whole. It would be the equivalent of a tax of 41.6 per cent on entire net profits."

"The 5 per cent tax cannot generally be passed on to the consumer. It is impossible to advance prices on a falling market. Very few manufacturers after paying this 5 per cent tax would have anything to pay under the excess profits tax. Their profits remaining, if any, would be less than 8 per cent of their investment."

"The official reports show names of more than 600 automobile manufacturers that have failed during the past five years."

"We believe that not more than one-half of our automobile manufacturers are breaking even. Few are making in excess of 10 per cent on their turnover."

"Material costs have gone up and are going up enormously."

"Prices have been driven to absolute top notch by high material and labor costs."

"Profits are probably not more than three-fourths what they were a year ago."

"During the past year, excluding Ford, 80 per cent or four-fifths of all new cars were sold to people who already owned cars and traded them in. If the 5 per cent tax is imposed, these people will largely keep their old cars instead of replacing them with new. Manufacturers will suffer seriously in their sales and the Government's proposed revenue from excess profits taxation will not materialize."

"The automobile business has already suffered curtailment through the declaration of war. Several thousand men have already been released from employment."

(Continued in next column)

Ball Bearing Makers Co-operate

S. K. F. Administrative Co. Formed to Manage H-B and S.K.F. Affairs

NEW YORK, May 9—Plans have been perfected for a closer co-operation between the S.K.F. Ball Bearing Co. and the Hess-Bright Co., by the formation of the S.K.F. Administrative Co., No. 1 Wall Street. As announced last Autumn certain local interests, including the National City Bank and Brown Bros., bankers, who were previously interested in the S.K.F. Ball Bearing Co., acquired an interest in the Hess-Bright Mfg. Co., Philadelphia.

The affairs of the two companies will be administered by the S.K.F. Administrative Co. The board of this company consists of Frank A. Vanderlip, president of the National City Bank, Thatcher Brown of Brown Bros., F. B. Kirkbride, S. Wingquist, Marcus Wallenberg, a banker in Sweden, Axel Carlander, and B. G. Prytz, who as president of the S.K.F. Ball Bearing Co. has been active in bringing about the fusion between his company and the Hess-Bright company. Mr. Prytz has been elected president of the Administrative company.

Simultaneously B. D. Gray of the Hess-Bright Co. has resigned as president of the Philadelphia company and will become technical advisor to the New York corporation. At the board meeting of the Hess-Bright company May 8, B. G. Prytz was elected to succeed Mr. Gray as president.

The company is planning making additions to its plants in Philadelphia and Hartford. The closer co-operation between the two companies was greatly facilitated by the action of the American Hess-Bright stockholders in buying out the German minority interest in the Hess-Bright Co., shortly before the break with Germany whereby all the stock came into American hands at what is reported to have been a very favorable price for the purchasers.

S. L. Smith, Oldsmobile Founder, Dead

DETROIT, May 9—Samuel L. Smith, founder of the Oldsmobile company 16 years ago, died yesterday in this city. He was president up to the time of his retirement about 8 years ago. He commercialized the automobile industry when

"People will not freely buy automobiles in war times, or under heavy tax conditions."

"Manufacturers have already begun to curtail output, which means manufacturing costs will go up inevitably. Reduction of output does not correspondingly save overhead which, next to material, is the largest element entering into the manufacture of cars and trucks."

"We offer our services to supply further information and details regarding the statements made herein."

it was in its infancy. He had the courage to spend millions on the industry. He turned out 4000 cars in 1902 with a net profit of \$210 on each car.

The original Dodge Brothers company received its first order from the Oldsmobile company, when an order for transmissions was placed with it. Another of the now prominent automobile companies to get one of its first orders from the Oldsmobile Company was the Cadillac company, which filled an order for motors placed with Henry M. Leland.

Mr. Smith developed the commercial possibilities of the automobile industry and many men prominent in the industry to-day started with his organization. The following were part of the original Oldsmobile company: R. E. Olds, of Reo; J. D. Maxwell, of Maxwell; W. F. Metzger, one of the original incorporators of the E. M. F. company; Roy Chapin, Howard E. Coffin and R. B. Jackson; C. D. Hastings and R. C. Hupp; J. F. Bourquin of Paige; Percy Owen, Liberty; and J. E. Bayerline and W. L. Daly, Columbia.

Mr. Smith was born in 1830 in Michigan. He made millions in the timber and lumber and shipping enterprises and was one of the developers of the Calumet and Hecla copper properties.

Swiss Adopt 3½-Ton Army Trucks

PARIS, May 5—Swiss automobile manufacturers have decided on the adoption of the 3½-ton truck as the most suitable type for military service in that country. The decision was arrived at after a meeting of the manufacturers and the military authorities. A suggestion was put forward for the creation of a uniform type of truck, to be made by all firms, sold to private users, and which could be requisitioned by the army in case of necessity.

It is practically certain that the Swiss authorities will adopt the French system of truck subsidies. Under this arrangement the military authorities agree to subsidize for the first 3 years of their existence any privately owned truck of an approved army type. The owner must present his truck annually for examination and must deliver it to the authorities in case of war. This subsidy only covers 2½ and 3½-ton trucks. In selecting the approved types the authorities are more concerned with performance than with design.

Special Committees Appointed to Co-ordinate Industries

WASHINGTON, May 9—Thomas F. Manville, president of the H. W. Johns-Manville Co., and H. Stuart Hotchkiss, president of the General Rubber Co., will serve on special committees appointed to assist in the co-ordination of industries. An extensive system of committees to serve under B. M. Baruch, chairman of the committee on raw materials of the advisory commission, has been announced by the Council of National Defense. Mr. Manville will be in charge of asbestos, magnesia and roofing, while Mr. Hotchkiss will take care of rubber.

March Exports Are \$10,030,973

Nearly Double February—
United Kingdom and Canada
Are Largest Buyers

WASHINGTON, D. C., May 7—Reports from all the ports in the United States show shipments totaling \$10,030,973 in trucks, passenger cars, and parts in March, compared with \$6,897,086 in February, and \$10,494,365 in March, 1916. Over half of these shipments were made through New York, where \$6,258,549 worth of trucks, cars and parts were shipped in March. Passenger car exports were increased nearly 66 2/3 per cent, while truck shipments were increased over 50 per cent.

United Kingdom Takes Most

The United Kingdom was our biggest buyer in March, her purchases increasing over \$1,500,000. Canada doubled her purchases during March, the total exports to that country being \$1,208,655, compared with \$526,767. Chile was our biggest buyer in South America, showing a large increase over the previous month. Argentina and Brazil also showed substantial gains. Australia tripled her purchases, being third largest in point of American automobile and truck purchases, which totaled \$365,527, compared with \$127,388 in February.

France and Russia fell off considerably in their purchases of American cars, France especially. Whether the large increase in English shipments has anything to do with the decrease in France is probable, but it is possible that many of the English trucks are shipped over to France. Russia fell off in the total value, but held the number of its purchases up to February's mark, increasing it by two.

For the 8 months ending March, the United States shipped \$85,614,953 worth of automobiles, trucks, and parts, compared with \$89,723,953 in the correspond-

ing period in 1916. Though the value decreased, the number of cars and trucks are practically the same, there being only a difference of three for the 8 months, the balance being in favor of the 1916 period, when 55,140 were shipped.

Jackson a Vice-President of Willys-Overland Co.

TOLEDO, May. 9—The Willys-Overland Co. yesterday elected Edwin Jackson a vice-president, Mr. Jackson was formerly in charge of the Packard Motor Car Co., New York. All of the other officers and directors remain the same. Mr. Willys voted 1,119,632 shares of common stock. He owns 829,790 shares and held 1237 proxies for 290,442 shares. Outstanding common stock amounts to 1,650,912 shares.

Stewart Adds 2-Ton Truck

BUFFALO, N. Y., May 8—The Stewart Motor Corp. has added a 2-ton truck to its line, known as Model 7. This brings the number of models up to four, the others being respectively of 1500-lb., 1-ton and 1½-ton capacity.

The addition of the new model is in accordance with the Stewart policy to make a complete range of trucks. The new model sells for \$1,975 f.o.b. Buffalo, with lead finish, \$20 extra for painting.

Some of the leading specifications include Buda 4½ by 5½ engine, Fuller unit powerplant clutch and gearset, Celfor internal-drive axle, and a 156-in. wheelbase. The truck is featured by its parallel straight-line frame and the use of Bound Brook oil-less bearings, reducing the number of grease cups to nine.

Among the important accessories used are the Zenith carbureter and the Berling magneto.

DETROIT, May 9—The Maxwell Motor Co. output is at the rate of 350 cars a day. The total output for April was 7900 cars. Production for the current fiscal year will aggregate about 80,000 cars.

G. M. C. Will Build Tractors

Factory at Pontiac—Steel Foundry Planned—Assembly Plant for Pacific Coast

DETROIT, May 5—General Motors Co. is preparing to make tractors on a large scale. W. C. Durant, president of the company, visited Pontiac this week for the purpose of viewing the operation of a tractor in the \$1,500 class, which will be made by the General Motors Truck Co.

The General Motors Co. has purchased a number of tractor rights within the past few months and plans to manufacture them in the different plants of its organization. Mr. Durant states that he will develop the tractor business as rapidly as the demand necessitates.

The General Motors Co. is starting the erection of a factory at Pontiac to build its new tractor. A steel foundry will also be built and a tractor assembly plant will be erected on the Pacific Coast.

Cylinders and Crank Shaft Rotate in New Engine

CHICAGO, May 5—An aviation engine in which cylinders and crankshaft both are permitted to rotate has been developed here by the Muffley Motors Co. and the design is such that it has aroused interest in governmental circles. It is known as the Muffley engine, and at present is designed for ten cylinders approximately 4½ by 5½ in. The engine as a whole is similar to the present rotating cylinder engines, such as the Gnome, except that not only do the cylinders rotate, but that the crankshaft rotates in the opposite direction, each at a speed of approximately 1200 r.p.m. The relative speed therefore is 2400 r.p.m. The valve action is almost the same as that used on the old Adams-Farwell engine, Glen Muffley, the de-

Exports of Automobiles, Trucks and Parts for March and 8 Previous Months

	March				Eight Previous Months			
	1916		1917		1916		1917	
	No.	Value	No.	Value	No.	Value	No.	Value
Passenger cars	5,539	\$3,726,939	5,755	\$4,025,389	38,795	\$29,261,446	43,200	\$32,229,103
Commercial cars	1,878	4,909,179	1,040	2,961,389	16,345	43,638,900	11,937	33,741,573
Parts, not including engines and tires..	.....	1,858,247	.....	3,044,195	.....	16,823,607	.....	19,644,277
Total	7,417	\$10,494,365	6,795	\$10,030,973	55,140	\$89,723,953	55,137	\$85,614,953
By Countries								
Denmark	55	\$41,351	46	\$49,581	524	\$356,256	1,157	\$885,026
France	948	2,405,437	151	301,843	5,147	13,203,663	4,461	13,078,244
Germany .....	.....	.....	.....	.....	.....	.....	.....	.....
Italy	45	23,514	.....	.....	252	169,658	77	48,430
Russia in Europe	28	95,753	67	135,848	4,596	14,434,529	2,352	6,032,228
United Kingdom	1,367	1,711,672	685	2,070,865	16,107	22,089,418	5,017	12,596,355
Other Europe	410	361,144	367	373,940	1,350	1,336,154	3,572	2,830,981
Canada	1,016	751,457	1,809	1,208,655	5,303	3,785,265	7,614	5,981,417
Mexico	65	45,895	308	178,325	291	284,421	1,137	733,988
West Indies and Bermuda	654	360,835	271	265,977	3,362	2,072,919	4,194	3,211,105
Argentina	357	185,099	270	150,078	2,992	1,384,959	3,079	1,795,330
Brazil	40	25,408	136	67,576	184	114,929	558	318,750
Chile	39	27,352	257	207,662	579	400,741	1,712	1,208,326
Venezuela	68	41,567	84	42,653	369	239,752	490	306,759
Other South America	81	44,799	278	159,405	413	234,869	1,379	845,813
British East Indies	267	205,795	402	291,015	2,126	1,606,196	4,101	3,029,073
Australia	785	648,529	447	365,527	4,790	4,052,446	3,928	2,909,988
Other Asia and Oceania	706	1,313,160	870	888,182	3,997	5,180,887	7,119	7,891,734
Other countries	486	347,351	347	229,921	2,758	1,953,284	3,190	2,269,129
Total	7,417	\$8,636,118	6,795	\$6,987,053	55,140	\$72,900,346	55,137	\$65,970,676

signer of the new engine, having been instrumental in the design of the earlier motor.

For aviation work two propellers are to be used, one operated by the crankshaft direct, and the other by the cylinders direct, the propellers being of opposite pitch and one behind the other, rotating in opposite directions. Muffley claims that the efficiency is higher than that of two propellers side by side, and very much higher than that of a single propeller. The use of two oppositely rotating propellers in this way is not new, as Captain Baldwin employed this arrangement many years ago in one of his dirigibles. The double rotation engine is also not a new idea, the Root motor, patented in England about 1912, being precisely similar in scheme.

DETROIT, May 9—Cornelius T. Myers has completed the designs for the 3½-ton and 5-ton trucks for the Fageol Motors Co., and quantity orders for materials have been placed. The Fageol company is pushing its truck production and expects to ship 2-ton trucks this month and larger trucks by June.

INDIANAPOLIS, May 7—The Butler Mfg. Co., maker of parts, is planning the installation of machinery for a second enlargement within a year. The company specializes in pistons of aluminum alloy and iron, semi-cast or standard cast, piston pins, etc.

Americans to Head Transport

Field Ambulance Corps Will Be Trained for Work by French Officers

PARIS, May 7—The American Field Ambulance Corps is planning to develop two new important branches of its work, namely, first, to form a military transport service, and second, a military school, at which the Americans will receive special training under French officers.

The Americans will have charge of the transportation of ammunition and field supplies at the main points where offensives are in progress, according to plans. It is hoped that the special military training will lead to appointment as officers of the French army after a few weeks of intensive training.

The development of these two new branches of work will probably lead to a change of the name to the American Field Service, or American Volunteer Corps.

3000 American Ambulances to Be Sent to France

WASHINGTON, D. C., May 4—The United States will send 3000 ambulances

and 7700 doctors and drivers to France, the Council of National Defense announced yesterday. The first unit of twenty-two ambulances and seventy men will leave within three weeks. This is in addition to the six medical units, comprising about 1000 medical men, which will be sent at once to Great Britain for service.

Summer Course to Be Given at University of Michigan

DETROIT, May 8—Walter G. Fishleigh, associate professor of automobile engineering at the University of Michigan and chairman of the professional division of the Detroit section of the Society of Automotive Engineers, states that the Ann Arbor institution will have a short automobile course in connection with its regular summer session. To be eligible students must be graduates of the university or of some other university of a technical nature. Those who are of mature age, and experienced in the automobile or general engineering field, not candidates for a degree, teachers of mechanical engineering and under graduates meeting the requirements, are also eligible.

DETROIT, May 9—Carl Hanson has become cost and production manager of the Dorris Motor Car Co., St. Louis. He was formerly cost and production manager of the General Motors Co.

Write Your Senator, Protesting Against 5% Tax!

SENATE OF THE UNITED STATES

Alabama
John H. Bankhead Oscar W. Underwood
Arizona
Henry F. Ashurst Marcus A. Smith
Arkansas
Joe T. Robinson William F. Kirby
California
Hiram Johnson James D. Phelan
Colorado
John F. Shafroth Charles S. Thomas
Connecticut
George P. McLean Frank E. Brandegee
Delaware
J. O. Wolcott Willard Saulsbury
Florida
Park Trammell Duncan U. Fletcher
Georgia
Thos. W. Hardwick Hoke Smith
Idaho
William E. Borah James H. Brady
Illinois
H. J. Lewis L. Y. Sherman
Indiana
Harry S. New James E. Watson
Iowa
William S. Kenyon Albert B. Cummins
Kansas
W. H. Thompson Charles Curtis
Kentucky
Ollie M. James J. C. W. Beckham
Louisiana
Joseph E. Ransdell Robert F. Broussard

Maine
Frederick Hale Bert M. Fernald
Maryland
J. I. France John W. Smith
Massachusetts
Henry Cabot Lodge John W. Weeks
Michigan
Chas. E. Townsend William A. Smith
Minnesota
Frank B. Kellogg Knute Nelson
Mississippi
John S. Williams J. K. Vardaman
Missouri
James A. Reed William J. Stone
Montana
Henry L. Myers Thomas J. Walsh
Nebraska
G. M. Hitchcock George W. Norris
Nevada
Key Pittman Francis G. Newlands
New Hampshire
Henry F. Hollis Jacob H. Gallinger
New Jersey
J. S. Frelinghuysen William Hughes
New Mexico
A. A. Jones Albert B. Fall
New York
William Calder Jas. W. Wadsworth
North Carolina
F. McL. Simmons Lee S. Overman
North Dakota
Porter J. McCumber Asle J. Gronna

Ohio
Atlee Pomerene Warren G. Harding
Oklahoma
Robert L. Owen Thomas P. Gore
Oregon
Harry Lane Geo. E. Chamberlain
Pennsylvania
Philander C. Knox Boies Penrose
Rhode Island
Peter G. Gerry Le Baron B. Colt
South Carolina
Benj. R. Tillman Ellison D. Smith
South Dakota
Edwin S. Johnson Thomas Sterling
Tennessee
K. D. McKellar John K. Shields
Texas
Chas. A. Culberson Morris Sheppard
Utah
Wm. H. King Reed Smoot
Vermont
Carroll S. Page W. P. Dillingham
Virginia
C. A. Swanson Thomas S. Martin
Washington
Miles Poindexter Wesley L. Jones
West Virginia
Howard Sutherland Nathan Goff
Wisconsin
Robt. M. LaFollette Paul O. Husting
Wyoming
John B. Kendrick Francis E. Warren

30,000 Drivers Needed in France

U. S. A. Trucks Hold Up Well —French Factories Produce 350 Aeroplanes Daily

GRAND RAPIDS, MICH., May 3—George Sweet, vice-president of the United Motors Co. of this city, has returned from France, with interesting information on aeroplanes, trucks and cars. Mr. Sweet visited France only, but made several flights while there and has an intimate knowledge of the conditions. There are 40,000 trucks on the French front, according to Mr. Sweet, 10,000 of which are driven by competent drivers, 30,000 of which are handled by men who lack a driving experience. Trucks are being used for ammunition, supplies, transporting soldiers and for carrying large searchlights with dials 3 ft. in diameter. These searchlights are for detecting aircraft.

Trucks Have Folding Seats

All of the trucks excepting those carrying searchlights are equipped with bodies similar to the old prairie schooner. The popular sizes are 3 and 5 tons. Many trucks are mounted 75-mm. guns. All trucks are provided with folding seats to be used for either carrying soldiers or freight. The trucks in back of the line are painted gray with green tarpaulins; in the front lines they wear the armor, anti-aircraft and long-barreled guns are in use. They are painted with blotches of yellow, green, brown and purple, so arranged as to make them look like foliage from the airplanes. Guns with 25-ft. barrels are carried on three trucks and the barrels and trucks are also so painted.

American trucks are holding up well. They are plentiful but not as numerous as the foreign makes. The French truck factories have increased their production tremendously and are now turning out 250 to 300 trucks per day.

Roads are generally good, great precautions having been taken to protect them. When the spring season approached and mild weather was forecasted orders were issued telling of the coming thaws and allowing only necessary loads to travel.

Repairs Highly Developed

Repairs have been developed to a high point and the allied nations are now equipped to keep trucks in commission for greater periods than during the first part of the war.

Gasoline is now 80 cents a gal. and considerably inferior to the quality France enjoyed before the war.

Many trailers are in use, these being provided with the same prairie schooner bodies as the trucks.

The trucks up in the front lines encounter serious mud conditions and are frequently forced to negotiate from 5 to 32 in. of mud in the battlefields.

The French government is consuming the entire output of its factories, and it is now no uncommon sight to see officials driving limousines at terrific speed over the battlefields. There are very few American cars. Ford cars are used in great numbers, especially for ambulance purposes.

Probably the most noticeable change in the French car is the rear dual pneumatic tire, with which all are now equipped, and the wire and disk wheels, which are used entirely. The tires are studded, and 34 by 3½ is the most common size.

The Fast Nieuports

Aeroplanes are being manufactured to the number of 350 per day in France, and are almost all of the biplane type. The monoplane type is going out. The Nieuport machine has been the leader, but this is now beginning to give way to the S. K. A. T. machine, a new plane which is expected to be considerably faster and which will be of one-seated type, only fitted with an Hispano-Suiza engine.

Nieuports are being made in one and two-seated styles. The one-seater makes 150 m.p.h. and is known as the chasse machine. It is equipped with rapid-fire gun capable of making 500 shots per min. When the aviators start on their flights they have but 500 rounds of ammunition with them, because when using the guns they are passing the enemy at a terrific rate of speed and can actually shoot but a few times at it.

The two-seater Nieuport is a fast observation machine and has two of these guns. One is placed in the front of the driver and the other, which is adjustable, is over the driver, for use by the observer. These aeroplanes are equipped with wireless of the receiving type only. They weigh 240 lb. and have a carrying capacity of 410 lb. The wireless is put on by means of a 4-in. strip of thin aluminum sheets, which are wrapped around the wing in the form of bands, but are under the linen so that when the craft is in the air it is impossible for an observer to note the wireless attachment. These two-seaters are equipped with 9-cyl. rotary engines, with a 220-hp. and capable of 105 m.p.h. The observer has a glass plate in the bottom of his compartment, and also a protected hole for dropping bombs and taking photographs. His compartment is equipped with pigeon holes for filing of plates and negatives. The observer also takes care of the wireless.

Two Flights Daily

Aeroplanes are common in Paris and are always to be seen or heard. Flights are made in all kinds of weather.

The aeroplanes are painted aluminum gray with red, white and blue rudders. The one-seat Nieuport will run for 2 hr., 45 min. The baby Nieuport runs for 2 hr., 15 min. The life of one of these aeroplanes is 40 hr., after which it is turned in for complete overhauling.

(Continued in next column.)

English Car Sales at Standstill

Few Cars Running by End of May on Account of Gasoline line Scarcity

LONDON, April 14—Lack of gasoline in England has practically disorganized the automobile and truck business here. It is predicted that few privately owned cars will be running by the end of May, when all existing licenses for gasoline will expire. After that date no new licenses to purchase this fuel will be issued except in cases of national importance. Up to that time the average motorist can buy from 8 to 16 gal. per month.

Conditions in the automobile business here are severe. Dealers who have cars on hand have a hard time disposing of them because of the strict regulations. Those who want to buy must obtain a permit from the Ministry of Munitions, which is granted only in cases where it is considered that the applicant's work is of national importance, and these permits are very rarely given.

Purchasers Must Secure Permit

Prospective purchasers of commercial vehicles must first of all get a permit from the Ministry of Munitions, which has full details of stocks held by all makers and importers. If an importer applies for a permit to bring in, say, fifty 1-tonners, the permit will not be considered if some other firm has a large stock of 1-tonners, the first company being supposed to turn over without fee its clients to the second firm, orders being thus on a communistic basis, and without a corresponding equal sharing of profits.

The same permit-business applies even for the repair of automobiles and trucks. A temporary adjustment or repair up to \$5 can be done without question, but anything over that needs a permit. There are still further restrictions due to the fact that no new mechanics can be employed or garage hands taken on without a labor permit, although the existing employees may be kept as long as the army does not demand them.

Flights are made twice daily on flying days, once in the morning and once in the afternoon. There are now 6000 pilots on the French front, which runs from Belgium to the Swiss border.

Mr. Sweet believes that America can best learn aviation by sending students to France. He believes that if the United States would pay the expenses of the students the French government would provide the teachers.

Hydroaeroplanes are now being developed, as are also big machines with double propellers.

Shipping conditions are very bad; congestion at Bordeaux is extremely serious. The docks are piled high and boats are crowded for space.

Personals

PHILADELPHIA, May 7—A. N. Goodfellow has been appointed Western sales manager of the Standard Roller Bearing Co. His headquarters will be in Detroit. He will cover the Middle West and part of the territory west of the Mississippi River.

H. B. Swaab, with headquarters in Indianapolis, will handle territory including Indiana (except South Bend and Michigan City), Kentucky, Ohio (except Cleveland, Canton, Toledo and Akron, and including Columbus, Cincinnati and Dayton).

H. L. Dunbar, with headquarters at Chicago, will handle the territory including Illinois, Wisconsin, Minnesota, North and South Dakota, Nebraska, Iowa, Kansas, Missouri, the northwestern corner of Indiana, including South Bend and Michigan City.

L. M. Watkin will cover the Eastern territory, headquarters being at Philadelphia.

TOLEDO, May 7—William R. McCulla, of the engineering department of the Willys-Overland Co. who has been in England on duty in the British army, has returned to the factory.

KALAMAZOO, MICH., May 4—Gould Allen has become sales manager of the Fuller & Sons Mfg. Co.

BROOKLYN, May 7—P. E. Mills, formerly assistant chief engineer of the Eisenmann Magneto Co., Brooklyn, has been made sales engineer of the company.

DETROIT, May 7—Ralph S. Lane, chief engineer of the Hyatt Roller Bearing Co., has resigned to devote his time to the operation of the Bearings Service Co. and the United Motors Service, Inc. of which companies he is president.

DETROIT, May 7—W. F. Herst has become general manager of the M. & S. Corp. He was active head of the Brown-Lipe Gear Co., Syracuse, N. Y.

ELKHART, IND., May 5—G. W. Cravens has become chief engineer of the Elkhart Carriage & Motor Car Co.

DETROIT, May 7—R. E. Wells has been appointed engineer of the passenger car division of the Hyatt Roller Bearing Co. Mr. Wells was formerly assistant engineer of the Hupp Motor Car Co.

MARINETTE, WIS., May 5—A cablegram was received in Marinette, Wis., on May 1 from the American consul at Moscow, Russia, announcing the safe arrival in Petrograd of Myron P. Sperry, who left the United States several weeks ago to take charge of the Willys-Overland Co.'s branch in the Russian capital.

DETROIT, May 7—W. O. and T. R. Thomas have opened headquarters here

as engineering specialists in the automobile industry and will act as consulting engineers for a number of automobile manufacturers. They formerly had offices in New York and England and were consulting engineers for the Mercedes company in Germany, the Minerva in Belgium, Laurin and Klement, of Austria, and Panhard-Levassor, of France.

KANSAS CITY, May 5—Charles DuChesneau, prominent in the automobile racing field as owner of the DuChesneau car, died from wounds on April 26, received when shot at by Doson business men, presuming he was a motor bandit.

JACKSON, MICH., May 5—W. B. Jameson has been appointed in charge of the factory of the Briscoe Motor Corp. Mr. Jameson was formerly in charge of the New Castle, Ind., factory of the Maxwell Motor Car Co.

CINCINNATI, May 7—Lieutenant F. B. Massey, transportation engineer of the United States Motor Truck Co., has been recalled for service by the government and has reported to the Boston navy yard.

NEW YORK, May 5—L. A. Jacob, who for years has been general assistant to H. Tipper, head of the advertising of the Texas Co., has been appointed superintendent of advertising for that company following the resignation of Mr. Tipper, who is now manager of THE AUTOMOBILE.

DETROIT, May 5—N. Wilson has been appointed assistant traffic manager of the Harroun Motors Corp. Mr. Wilson was formerly assistant traffic manager of the Maxwell Motor Co.

DETROIT, May 7—R. C. Durant, son of W. C. Durant, president of the Chevrolet Motors Co. and the General Motors Co., has volunteered for service in the aviation branch of the signal corps.

ST. CLOUD, MINN., May 9—Victor Launeau has been appointed chief automobile designing engineer of the Pan Motor Co., a new concern organized under the Delaware laws for \$5,000,000 to manufacture automobiles, trucks and tractors. Mr. Launeau was formerly research engineer of the Buick Motor Co.

HARTFORD, WIS., May 7—Ralph Kaye has assumed charge of the advertising and publicity department of the Kissel Motor Car Co.

DETROIT, May 5—J. B. Banta has been appointed supervisor of sales for the Smith Motor Co., Locomobile and Stutz dealer here. Mr. Banta has served with the Locomobile company for 9 years and

was formerly the company's representative in Chicago.

NEW YORK, May 4—Arthur Hirshon has resigned from Ewing and Miles and has joined the Bayer-Stroud Corp. He specializes in automobile and accessory advertising.

NEW YORK, May 8—E. H. Stickles has resigned from the presidency of the Holt-Welles Co., selling agent of the Brantford carbureter. He is contemplating entering the automobile accessory field as factory representative.

CLEVELAND, May 8—P. W. Gilbert, sales manager of the rim and tube division of the Standard Parts Co., has been made assistant general manager. B. W. Quayle, who has been the general sales representative, succeeds Mr. Gilbert in the rim and tube sales management.

NEW YORK, May 7—The P. J. Durham Co. has been appointed official service representative of Brooklyn and Newark, N. J., for Bijur electric starting and lighting systems.

NEW YORK, May 7—In the report of the discussion of the paper on automobile engine cooling read by A. K. Chancey before the Cleveland S. A. E., Louis Schwitzer was mentioned as production manager of the Empire Automobile Co. This was due to misinformation on the part of the correspondent, as Mr. Schwitzer has been engineer of the Oakes Co. of Indianapolis since last summer.

ELECTIONS

CLEVELAND, May 7—The retiring directors of the White Motor Co. were re-elected at the annual meeting of the stockholders. At the organization meeting of the board of directors, the same organization was continued by the re-election of the present officers of the company.

The directors are as follows: M. B. Johnson, Windsor T. White, Walter C. White, E. W. Hulet, A. P. Warner, Otto Miller, J. R. Nutt, J. H. Harding, Theo. Roosevelt, Jr., E. R. Tinker and A. M. Hall, 2nd.

The officers follow: M. B. Johnson, chairman of the board; Windsor T. White, president; Walter C. White, first vice-president; E. W. Hulet, second vice-president; A. R. Warner, secretary, and Otto Miller, treasurer.

MILWAUKEE, WIS., May 5—The Kemp-smith Mfg. Co., Milwaukee, maker of the Kemp-smith milling machine, used in practically every automobile and engine manufacturing plant in the world, has reorganized its official personnel upon increasing the capital stock from \$250,-

000 to \$300,000. Paul E. Thomas, who has been secretary-treasurer and general manager for 13 years, becomes president and treasurer, continuing as general manager. John Goetz, works manager, has been elected vice-president. Franz Wollaeger, Jr., assumes the position of secretary. Peter Lowe, manager of sales and advertising, has been elected assistant secretary. E. E. Leason, manager of purchases, becomes also assistant treasurer.

SOUTH BEND, IND., May 5—F. Studebaker Fish has been elected a member of the executive committee to succeed his father, the late Nelson J. Riley.

SOUTH BEND, IND., May 7—J. M. Studebaker, Jr., has been elected a member of the executive committee to succeed his father, the late J. M. Studebaker, Sr.,

and F. S. Fish has been elected a director to fill the vacancy left by the death of N. J. Riley.

TOLEDO, April 10—John N. Willys has been elected a director of the Curtiss Aeroplane & Motor Corp., to succeed H. Saure Wheeler, resigned. The Willys-Overland Co. recently contracted with the Curtiss company to manufacture 4500 aeroplane engines for the United States Government.

NEW YORK, May 7—The Prest-O-Lite Co. at to-day's stockholders' meeting re-elected its seven directors, as follows: C. J. Fisher, J. E. Allison, F. E. Sweet, J. M. Noble, S. M. Cooley, Harry Murphy and M. J. Carmey.

EDGERTON, WIS., May 4—The Edgerton Highway Trailer Co., capital \$180,000,

has perfected its organization by the election of the following officers: President and general manager, James W. Menhall, Beloit; vice-president, M. Johnson, of Gisholt Machine Co., Madison; secretary, E. Z. Menhall, Beloit; treasurer, A. J. McIntosh, Edgerton; assistant-secretary and treasurer, C. A. Florey, Beloit; directors, Frank Pringle, B. Wilson, A. J. McIntosh, C. A. Florey and J. W. Menhall. The company at the same time took possession of the two factories of the Edgerton Wagon Co., purchased for \$12,000, and on May 7 will commence active production of two and four-wheeled trailers, designed and patented by James Menhall, who, until recently, was vice-president of the Warner Auto-Trailer Co., Beloit. Mr. Menhall is also said to be ready to manufacture a number of other new automobile specialties, including a fifth wheel device.

Factory Activities

WAYNE, MICH., May 5—The offices of the Harroun Motors Corp. have opened and all the officers are now carrying on their activities here with the exception of John Guy Monihan, president, and Paul Hale Bruske, advertising manager, who are in Detroit. The company plans to add two additional stories to the main building.

CLEVELAND, May 8—The Standard Equipment Co., a \$300,000 corporation which is an outgrowth of the Horton Co., has started work of construction on a plant to cost \$150,000. The company manufactures bow sockets for automobiles, hoisting apparatus for drum trucks and starting equipments. Officers are G. G. G. Peckham of the Ohio Buick Co., president and general manager; Walter C. Baker and Fred C. Dorn of the American Ball Bearing Co., are treasurer and secretary respectively. J. A. Curtis, J. Robert Crouse and Roland Meacham are directors.

NEW YORK, May 7—The H. W. Johns-Manville Co. will concentrate its automobile accessory manufacturing in New Rochelle, where it is at present manufacturing its speedometers in the old Jones Speedometer Co. plant. The automobile accessory plant will be moved from Brooklyn. To take care of this concentration, the company is erecting a large four-story addition, giving it 75,000 sq. ft. additional space.

DETROIT, May 7—The Detroit Weather Proof Top Co. will locate in Pontiac. It has arranged to occupy five buildings formerly belonging to the old Flanders plant.

DETROIT, May 7—The Fisher Body Corp. will erect a five-story building in addition to its present plant.

AKRON, May 3—The Goodyear Tire & Rubber Co. has moved its clocks forward 1 hr. All departments of the plant are now operating on Eastern time.

SHEBOYGAN FALLS, WIS., May 5—The Falls Motors Corp., on May 1 adopted the daylight saving plan by setting all clocks an hour ahead, and will keep the schedule in force during the summer months. Many of the employees reside in the city of Sheboygan, which with other large cities of the west shore of Lake Michigan, has made the daylight saving plan a universal law by city ordinance.

MILWAUKEE, WIS., May 5—The Briggs & Stratton Co., maker of coils, switches and other gas engine and automobile specialties, May 5, took occupancy of its new \$100,000 plant, at Hopkins and Lewis Streets. The former plant was located at 258 Milwaukee Street. Employees of the company held a celebration in the new plant, which is four and six stories high, 100 by 100, on May 3. They presented the company with a large American flag, which was raised over the structure. The occasion also celebrated the eighth anniversary of the founding of the Briggs & Stratton Co.

BATAVIA, ILL., May 7—The Curtis Form-A-Tractor Co., Chicago, will open a plant here. The abandoned plant of the Batavia Engineering Works, will be occupied. An enlargement will be made as the Chicago company requires 60,000 sq. ft. of space. Machinery will be removed to Batavia at once. The company will employ 100 men at the outset and will increase this number as the needs of the business requires. It is desired to have the plant in operation about June 1 or as soon thereafter as possible.

SPRINGFIELD, MASS., May 6—Rumors that the Knox Motors Co. had sold its plant are stated to be groundless by

officials of the company. Orders for over \$1,000,000 worth of tractors, traction units and aeroplane engines have necessitated day and night operation.

DETROIT, May 7—The National Twist Drill & Tool Co. will put up an additional four-story building.

ALMA, MICH., May 8—Marcus Pollasky has tendered the Republic Motor Truck Co. plant at Alma and its subsidiary, the Torbesen Axle & Gear Co. at Cleveland, to the Government for operation without profit in any way that may be needed. Mr. Pollasky has also announced that he is ready to personally raise a regiment of 1220 men in Gratiot County.

WAGE INCREASES

FORT WAYNE, IND., May 8—S. F. Bowser & Co., Inc., has given its employees a wage increase of 25 to 30 per cent. About 900 employees profit by the advance.

PHILADELPHIA, May 7—The Vim Motor Truck Co. has increased its wages 10 per cent. A reduction of 2½ hours per week in the factory's actual working time was also made. This does not affect the wages.

PRODUCTION

DETROIT, May 7—The Saxon Motor Car Corp. in April shipped 3199 cars. For the first 4 months of the year shipments amounted to 10,320 cars compared with 9796 cars in the same period of 1916 and 4329 cars in 1915.

LONG ISLAND CITY, N. Y., May 7—The Moto-Meter Co., maker of the Boyce Moto-Meter, reports a quarterly business exceeding that of the entire shipments of 1916. New equipment is being installed in the factory and a daily production of 5000 Moto-Meters will shortly be reached.

Doble Capital Now \$1,000,000

Doble-Detroit Steam Motor Co.
Formed to Make and Market Car

DETROIT, May 8—The Doble-Detroit Steam Motor Co. has been formed with a capital of \$1,000,000 to manufacture and market the Doble steam car. The General Engineering Corp. remains a separate unit and will continue as an engineering concern to handle all the engineering work. The new company will be the only one with the right to use the name Doble in its name or on its products, though other concerns may be licensed under the Doble patents to use the Doble power plant. The names of the officers of the company have not been divulged though it is understood they are prominent men. More than 1100 dealers are already included in the Doble dealer organization and these have contracted for \$12,000,000 worth of cars.

The par value of the stock of the new company is \$10. It is being subscribed for at \$11, and investors are guaranteed that full par value of the stock will go into the treasury in actual cash, the additional \$1 per share being sufficient to pay all organizing expenses of every kind.

The car to be produced first will be the seven-passenger model to sell at \$2,500. Other models at a lesser price will be added to the line in the future and at a later time the company will devote its attention to the adaptation of steam to motor trucks, tractors, motor boats, aeroplanes and interurban cars.

The Doble-Detroit Steam Motors Co. will build under a license from the General Engineering Co. Six men connected with the General Engineering Co. constitute the organization committee of the new concern and in connection with C. L. Lewis, chairman, M. J. Hammers, T. P. Meyers, Abner Doble, Wade Millis and F. M. Knapp.

CHANGES IN PRICE

Maker and Model	Old Price	New Price	Effective
Mitchell, D-40 2-Pas.	\$1,150	\$1,195	May 10
Mitchell, D-40 5-Pas.	1,150	1,195	May 10
Stephens, 60-65 2-Pas.	1,150	1,250	.....
Stephens, 60-65 5-Pas.	1,150	1,250	.....
KisselKar, 6-42 5-Pas.	1,700	1,750	.....
KisselKar, 6-42 Sedan.	2,050	2,100	.....
Louverne, 17	1,500	1,650	.....
Simplex, Chassis	6,000	7,000	.....
Glide, 6-40 5-Pas.	1,250	1,295	.....
Glide, 6-40 Sedan	1,450	1,495	.....
Pullman, 2-Pas.	850	910	.....
Maibohm, 2-Pas.	695	795	.....
Autocar, Chassis	1,650	1,815	.....

Equipment and Other Car Changes

NEW YORK, May 7—A number of important changes in the equipment of the different automobiles was made during April. Hudson has added a four-passenger phaeton at \$1,750. The Stephens is now equipped with Delco ignition, Stromberg carbureter and Delco starter. Kissel has changed the tire size on its Hundred Point Six from 33 by 4 to 34

by 4. The 6-42 and the twelve have 34 by 4½-in. tires instead of 34 by 4.

Metz is equipping its cars with Atwater Kent ignition and Westinghouse starting and lighting. King is using Bijur starting and lighting. Paige is fitting its models 6-51 with the Remy starter, and the 6-39 with the Stromberg carbureter. Regal has changed to Heinze-Springfield ignition and starter on its model 4-32. Empire is using Connecticut ignition on its model 45 and has also changed to dry plate clutch instead of cone. Empire has dropped the old model numbers and has substituted the numbers 50, 51 and 70 A. Model 51 is the same as model 50, except that it has wire wheels and sells at \$1,165 compared with \$1,125 for model 50.

Chalmers wheelbase is now 117 instead of 115 in. Apperson has changed the bore of the eight to 3¼ from 3½, the stroke remaining 5 in., increasing its formula horsepower from 31.3 to 33.2. Pullman now uses Atwater Kent ignition and Dyneto starting and lighting.

The new 6-60 Abbott will have a 7-N six-cylinder Continental engine, 3½ by 5¼, Remy ignition, starting and lighting, Stromberg carbureter, dry plate clutch, three-speed gearset, 122 in. wheelbase and 34 by 4 straight side tires. It will be made as a seven-passenger open car at \$1,595, coupé at \$2,100 and sedan at \$2,150.

The bore of the Chandler has been increased from 3½ to 3¾, the stroke remaining at 5 in.

NEW COMPANIES

DOVER, DEL., May 7—The Bessemer Motor Truck Co. has been incorporated with a capital of \$2,000,000 to manufacture automobile trucks. C. L. Rinlinger, C. M. Enger and M. V. Haywood are the incorporators.

DETROIT, May 7—M. C. Kessler has formed the Kessler Motor Co. to build a six-cylinder aeroplane engine developing 250 hp. at 24 r.p.m., and weighing about 570 lb. This engine has been approved by the United States government. A factory will be built here. Mr. Kessler is president, J. R. Killian is vice-president, and N. C. Brooks is secretary; H. C. Brooks, Jr., treasurer, and J. A. Ball, general manager.

INDIANAPOLIS, May 7—The Shotwell Pump and Tank Co. has been organized to manufacture pumps and underground tanks for handling gasoline and oils. Charles W. Shotwell, an Indianapolis business man, is president. He was formerly connected with the Fairbanks-Morse Co. Other officers are R. W. Murphy, treasurer; F. B. Fowler, secretary; B. P. Benritze, production manager; T. R. Lewis, H. M. Moore, H. E. Kinney and J. H. McConnell, formerly of the S. F. Bowser Co., Fort Wayne, who will serve as sales manager.

ALBANY, N. Y., May 7—The Carlisle Cord Tire Co. has been formed to manufacture automobile tires. It is capitalized at \$550,000. The incorporators are: F. R. Series, G. F. Handel, H. G. Wenzel.

To Build Double Drive Truck

Wisconsin Duplex Auto Co.
Formed by W. A. Besserdich
—1-Tonners at Low Price

CLINTONVILLE, WIS., May 5—William A. Besserdich, one of the founders of the Four Wheel Drive Automobile Co., has organized the Wisconsin Duplex Auto Co., with a capital stock of \$500,000, to manufacture a new type of double-drive utility cars. It is said the new product will be a light delivery type which will be made in large quantities and sold at a comparatively low price. The maximum capacity probably will be kept at 1 ton. It is also said that plans of the new company contemplate the issue of a passenger car type.

Fifty per cent of the stock in the new concern already has been subscribed, and a permanent organization has been effected by the election of the following officers: President and chief engineer, William A. Besserdich; vice-president, A. S. Larson; secretary and manager, B. A. Mosling; treasurer, J. P. Mosling; directors, the officers and J. H. Frank.

A factory will be established as soon as possible, the definite location depending upon inducements offered by cities desirous of obtaining the new industry. For the present a shop and offices will be maintained at Clintonville, which may be made permanent.

A feature of the new product will be the ball-and-socket joint unit in the duplex transmission system. This is a new design by Mr. Besserdich and B. A. Mosling.

Mr. Besserdich and F. A. Zachow, who operated a machine shop in Clintonville for many years, designed the four-wheel-drive system which is incorporated in the present F. W. D. truck.

Business Publishers Protest Proposed Increased Postal Rates

NEW YORK, May 7—The Editorial Conference of the New York Business Publishers Assn., at its meeting to-day, sent the following telegram to Claude Kitchin, M. C., of the Ways and Means Committee, Washington:

"Forty-one editors of business papers, representing twenty-three industries, assembled in New York today, urge that business publishing is an educational industry; that it should be taxed on profits only; that it wishes to patriotically share its equitable proportion of war taxation, but that it should not be singled out for special taxation such as a higher second-class postage rate; that such a tax strikes at the fundamentals of this industry. In war time industries must be maintained, not destroyed. Tax our profits as necessary, but do not destroy our ability to carry on our business."

\$8,000,000 Detroit Order from N. Y.

NEW YORK, May 10—Carl H. Page has contracted with the Detroit Motor Car Co., Detroit, for \$8,000,000 worth of cars. Page took over this agency a short time ago. He has also increased his contract for Jordan cars.

Stearns Plans Large Expansion

Capital Increased from \$400,000 to \$2,000,000—Other Capital Changes

CLEVELAND, May 5—In order to take care of a contemplated expansion, the F. B. Stearns Co. has increased its capital from \$400,000 to \$2,000,000. The company will sell \$750,000 of the new stock to take care of the expansion program. Of this \$500,000 will be preferred and \$250,000 common.

It is understood that present shareholders will get a stock dividend of 210 per cent, giving them 3.1 shares for every one share now held. There will still be a surplus after this dividend, as the company has been husbanding its resources over a long period.

DETROIT, May 9—The J. C. Wilson Co. has increased its capital from \$225,000 to \$1,000,000.

DETROIT, May 7—The Briggs Mfg. Co. has increased its capital from \$50,000 to \$750,000. The Briggs company paints and trims automobile bodies.

Wisconsin Motor Stock Issue

MILWAUKEE, WIS., May 5—The Wisconsin Motor Mfg. Co., maker of the Wisconsin motor, has placed on the market a \$300,000 preferred stock issue, 7 per cent cumulative, dated March 1, 1917, redeemable on or after March 1, 1919, at 103½ per cent of par value, plus all

accrued and unpaid dividends. The company recently increased its capital stock from \$350,000 to \$1,000,000, consisting of \$700,000 common and \$300,000 preferred, all of a par value of \$100. At this time the company is building a large shop addition, which will increase the capacity from 50 to 75 per cent.

Republic Stock on Exchange

NEW YORK, May 4—Application will soon be made by the Republic Motor Truck Co. to list its stock on the Stock Exchange. Earnings for the year ending June 30, 1917, it is estimated, will care for the 7 per cent dividend on the \$1,000,000 of preferred stock and leave more than 20 per cent for the 62,500 shares of the common outstanding without par value.

GRAND RAPIDS, MICH., May 5—The Hayes-Ionia Co. has sold all of the \$175,000 worth of seven per cent cumulative preferred stock which it offered to the public.

Dividends Declared

Maxwell Motor Co., quarterly of \$2.50 per share on common and \$1.75 per share on preferred payable July 2, to stock of record June 11.

SOUTH BEND, IND., May 2—The Studebaker Corp. quarterly of one and three-quarters per cent on preferred and two and one-half per cent on common, payable May 19.

U. S. Truck Sales \$1,746,000

CINCINNATI, OHIO, May 7—The United States Motor Truck Co. sold \$1,746,000 worth of trucks in the first quarter of this year.

Little Demand for Securities

Pending Government Action Responsible for Small Trade—Much Liquidation

NEW YORK, May 8—Automobile and accessory securities last week slumped on account of the pending government action. Buyers are waiting to see which way the automobile industry will be affected in the present action of the government to raise revenue to carry on the war. Though much of the stock is being held by investors, some of it has been unloaded on the market, resulting in lower prices.

Losses last week ranged from a fraction to 15 points. Gains ranged from a fraction to 4 points. Tire issues were in a majority of cases lower. Goodrich dropped 2½ points on its common; Goodyear went down 15 points; and Miller 10 points. On the other hand, Swinehart rose 3 points, Ajax ½ point, and Portage 2 points.

Maxwell common rose again this week, recording a gain of 1½ points. Last week it rose a point. Chevrolet, which gained 4 points the previous week, held strong and rose 1 point to 103. General Motors dropped 2 points to 106½ and United Motors also suffered a loss, going to 30½, a drop of 3½ points. The Willys-Overland quotation remained unchanged at 30.

ALMA, MICH., May 7—The J. F. Field Co., truck bodies, will build a one-story factory and office building, 60 by 300 ft.

Automobile Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co.....	68	70	+ ½
*J. I. Case T. M. Co. pfd.....	84	86	+1
Chalmers Motor Co., com.....	..	20	..
Chalmers Motor Co. pfd.....	..	..	..
*Chandler Motor Car Co.....	94	100	+1
Chevrolet Motor Co.....	103	104½	+1
Fisher Body Corp. com.....	32	38	..
Fisher Body Corp. pfd.....	94	96	+4
Fisk Rubber Co. com.....	70	75	..
Fisk Rubber Co. 1st pfd.....	103	106	..
Fisk Rubber Co. 2nd pfd.....	92	95	..
Firestone Tire & Rubber Co. com.....	128	131	+1
Firestone Tire & Rubber Co. pfd.....	106	108	- ½
*General Motors Co. com.....	106½	107½	-2
*General Motors Co. pfd.....	89	90¾	-2
*B. F. Goodrich Co. com.....	48½	50	-2½
*B. F. Goodrich Co. pfd.....	106	109	-1
Goodyear Tire & Rubber Co. com.....	195	200	-15
Goodyear Tire & Rubber Co. pfd.....	106½	108¾	..
Grant Motor Car Corp.....	5	8	..
Hupp Motor Car Corp. com.....	3	4	- ½
Hupp Motor Car Corp. pfd.....	74	80	..
International Motor Co. com.....	..	16	..
International Motor Co. 1st pfd.....	..	70	..
International Motor Co. 2nd pfd.....	..	30	..
*Kelly-Springfield Tire Co. com.....	49	51	-3
*Kelly-Springfield Tire Co. 1st pfd.....	87	94	-1
*Lee Rubber & Tire Corp.....	18	18½	-1¾
*Maxwell Motor Co., Inc., com.....	51	52	+1¾
*Maxwell Motor Co., Inc., 1st pfd.....	66	67	+2
*Maxwell Motor Co., Inc., 2nd pfd.....	30½	32	- ½
Miller Rubber Co. com.....	195	204	-10
Miller Rubber Co. pfd.....	104	106	- ½
Packard Motor Car Co. com.....	..	152	..
Packard Motor Car Co. pfd.....	..	101½	..
Paige-Detroit Motor Car Co.....	32	33½	-1½
Peerless Truck & Motor Corp.....	11	11½	-1
Portage Rubber Co. com.....	145	150	+2
Portage Rubber Co. pfd.....	..	..	..
Regal Motor Car Co. pfd.....	..	24	..
Reo Motor Car Co.....	28¾	29½	-2½
*Saxon Motor Car Corp.....	46½	47½	+1
Springfield Body Corp. com.....	52	62	-8
Springfield Body Corp. pfd.....	100	110	..

	Bid	Asked	Net Ch'ge
Standard Motor Construction Co.....	11½	12½	-1½
*Stewart-Warner Speed. Corp.....	74¼	75¼	-6¼
*Studebaker Corp. com.....	89	89½	+1½
*Studebaker Corp. pfd.....	101	107	-3½
Swinehart Tire & Rubber Co.....	68	72	+3
United Motors Corp.....	30¾	30¾	-3¾
*U. S. Rubber Co. com.....	55½	56	-2½
*U. S. Rubber Co. pfd.....	106½	107	+ ½
*White Motor Co.....	44¼	45	-1½
*Willys-Overland Co., com.....	30	30½	..
*Willys-Overland Co. pfd.....	95	97	- ½

*At close May 7, 1917. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.....	..	31	..
Chalmers Motor Co. com.....	..	..	..
Chalmers Motor Co. pfd.....	..	..	..
Continental Motor Corp. com.....	6¼	7¼	- ½
Continental Motor Corp. pfd.....	97	97½	..
Ford Motor Co. of Canada.....	..	255	..
General Motors Co. com.....	..	..	..
General Motors Co. pfd.....	..	..	..
Maxwell Motor Co. com.....	..	..	..
Maxwell Motor Co. 1st pfd.....	..	..	..
Maxwell Motor Co. 2nd pfd.....	..	..	..
Packard Motor Car Co. com.....	..	150	..
Packard Motor Car Co. pfd.....	..	100	..
Paige-Detroit Motor Car Co.....	..	33	..
Prudden Wheel Co.....	23	27	-4½
Reo Motor Car Co.....	29	29¾	-3
Studebaker Corp. com.....	..	..	..
Studebaker Corp. pfd.....	..	..	..
C. M. Hall Lamp Co.....	23	25	..

INACTIVE STOCKS

Atlas Drop Forge Co.....	..	..	..
Kelsey Wheel Co.....	..	..	..
Regal Motor Car Co.....	..	26½	..

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.	..	31	..
Chalmers Motor Co. com.	..	..	..
Chalmers Motor Co. pfd.	..	..	..
Continental Motor Corp. com.	6¼	7½	-¼
Continental Motor Corp. pfd.	97	97½	..
Ford Motor Co. of Canada.	..	255	..
General Motors Co. com.	..	..	..
General Motors Co. pfd.	..	..	..
Maxwell Motor Co. com.	..	..	..
Maxwell Motor Co. 1st pfd.	..	..	..
Maxwell Motor Co. 2nd pfd.	..	..	..
Packard Motor Car Co. com.	..	150	..
Packard Motor Car Co. pfd.	..	100	..
Paige-Detroit Motor Car Co.	..	33	..
Prudden Wheel Co.	23	27	-4½
Reo Motor Car Co.	29	29½	-3
Studebaker Corp. com.	..	..	..
Studebaker Corp. pfd.	..	..	..
C. M. Hall Lamp Co.	23	25	..

INACTIVE STOCKS

Atlas Drop Forge Co.	..	..
Kelsey Wheel Co.	..	..
Regal Motor Car Co.	26½	..

N. Y. Dealers' Fees Fixed

Hewitt Bill Regulating Issuance of Licenses Becomes Law February, 1918

NEW YORK, May 7—The Legislature in Albany has passed the Hewitt bill. It has been signed by the Governor, becoming effective February, 1918. The dealers are in favor of it.

The measure has to do entirely with the issuance of license plates to dealers and their use of them. The salient features of the new measure follow:

Annual fee of \$15 for dealers with a charge of \$5 for each additional set of plates (additional plates now cost \$2.50).

Limits the number of plates to each dealer to five sets, including the original set, and permits application for additional plates to be acted on by the Secretary of State.

Prohibits dealers driving cars with dealers' plates on them for private purposes, for pleasure or for hire.

Permits the issuance of duplicate plates for any that are lost or destroyed upon the filing of an affidavit.

Limits the use of dealer plates by purchasers of new cars to five days instead of 15.

Under the new bill, 1918 dealer plates will indicate on them the number of sets issued to each dealer. For example, the original plate might be M171; additional plates would be numbered M171-2, M171-3, -4, -5. This is done to assist in the identification of dealer cars which are operated in such a manner as to violate any of the traffic rules, etc.

When purchasers of new cars borrow plates from the dealer, the dealer must file a statement with the Secretary of State, giving the date and name and address of the person to whom the plates were loaned. The owner must also file a statement with the Secretary of State.

Chicago Race Date Changed

CHICAGO, May 7—The Chicago Automobile Derby, scheduled for June 9, has been set back until June 16, because of the desire to give the drivers more time after the Cincinnati Memorial day race to repair any cars which might be damaged in that event. The race will be for 250 miles, and the prize money has been set at \$21,000.

Rhode Island Lowers Bars to Visiting Motorists

PROVIDENCE, R. I., May 5—Rhode Island has let down the bars to visiting motorists, being the most important legislation passed this year. Before this decision, automobile visitors were allowed only 10 days in any one year, the same as New Hampshire. Now the restrictions have been lifted and an effort will be made also to liberalize New Hampshire.

Chalmers Establishes N. Y. Branch

NEW YORK, May 7—The C. T. Silver Motor Co. has discontinued handling the Chalmers car in Metropolitan territory. A Chalmers branch has been established

in New York and will handle both wholesale and retail sales in the Metropolitan territory and environs.

For the present the Silver company will concentrate its efforts on the distribution of the Dort.

Chalmers sales will be handled by a new company which is to be styled Chalmers Sales Co., though it will be a direct factory branch. It will be in charge of C. H. King, who has been head of the department of dealers for the Chalmers company since March of this year.

Redden and Cook Ask Injunction in Patent Controversy

CHICAGO, May 5—Another development in the patent controversy among truck-forming makers has been made through the petition of the Redden Motor Truck Co. and Albert E. Cook, owner of the Cook truck-forming patents, in the United States district court here for an injunction ordering the Smith Motor Truck Co. to discontinue manufacturing Form-A-Trucks. Infringement of the petitioners' patent rights is alleged.

This petition is another step in the suit brought last August in the United States district court in Chicago by Cook and the Redden company, in which infringement of the Cook patents is claimed. The suit is still pending. The Smith company filed suit in October in the circuit court of Cook county to restrain Cook and Charles W. Hills, attorney for Cook and the Redden Motor Truck Co., from representing that they have a valid contract under which the Smith company has agreed to pay royalties for operating under these patents.

P. O. Dept. Opens Truck Proposals

WASHINGTON, D. C., May 7—The Post-office Department has rejected bids furnishing trucks of 750 lb. capacity. Sealed proposals for furnishing these chassis as they may be ordered for use of the postal service will be received until 10 a. m. May 16.

J. A. Edgerton, purchasing agent of the department, has given notice that in addition to other specifications trucks to be purchased for post office service in the future shall include this equipment:

Two electric or gas headlights equipped with dimmers, two oil side and one oil tail light, one mechanical or electric horn, one hub odometer of type approved by the department to be attached to left front wheel, one jack, one set of anti-skid chains of approved design and appropriate for size of truck, one standard set of tools. Side oil lamps to be one piece heavy steel body, double supports, combination socket, round body. Tail oil lamp to be one piece heavy steel body, left hand single support, combination socket, round body.

The department is also contemplating the extension of motor service in the near future to all star routes it controls, motor service now being very generally in use in the rural free delivery service.

41,306 Licensed in Maryland

BALTIMORE, May 7—Automobile registrations to date have reached 41,306 in this State, divided into 37,428 passenger cars, 2245 trucks, and 1633 hiring cars.

More Farm Tractors Needed

Kansas City Territory Finds Shortage for Present Needs —Larger Output Urged

KANSAS CITY, MO., May 5—Kansas City territory dealers in automobiles, tractors and accessories are worrying about only one thing now—and that is deliveries. The tractor phase is the most serious. Kansas City is short right now of tractors that ought to be delivered within a few weeks—many of them ought to be in the fields now, after the recent heavy rains. One firm—the next to the largest in the tractor business—is fifty cars behind in its orders.

It is imperative that large increase in the production of tractors be made, to supply the demand for plowing in July and August, immediately following the wheat harvest. The demand is already being accelerated by the educational campaign of the Kansas City Tractor Club, which has worked so far chiefly among bankers, urging them to encourage the intensive farming methods that go with tractors. Many bankers have responded that they are taking up the work in their districts. The Tractor Club will carry this educational work to all classes of business men in the farming communities, and to the farmers themselves, in preparation for an increased production next year.

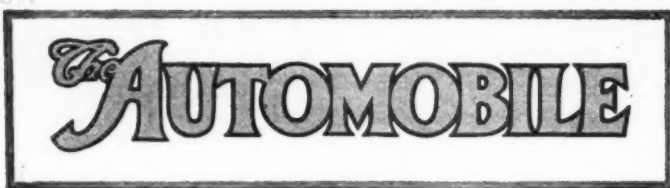
Chevrolet Breaks Uniontown Records

UNIONTOWN, PA., May 7—Uniontown Speedway track records were broken here this afternoon during the qualification trials for Thursday's races when Louis Chevrolet, driving his Frontenac, made the lap at the rate of 100 m.p.h. Thirteen machines qualified with only 5 sec. difference in the time of the fastest and the slowest.

Crow-Elkhart Enters Foreign Field

ELKHART, IND., May 7—The Crow-Elkhart Motor Co. has established a foreign department. Pierre Maas has become export manager. Extensive merchandising plans, which involve the marketing of cars on every continent, have been formed. Mr. Maas has been in the export field in Europe, having for 8 years managed the export business of the Swift Co., Ltd., Coventry, England. He has also been in the automobile business in Paris and Brussels and the shipping trade in Antwerp.

CLEVELAND, May 7—The Disbrow Motors Corp. has closed a contract with the E. L. Smith for 250 Disbrow "Special" cars, which is one-tenth of the output for 1917. Mr. Smith will handle the entire Atlantic coast as far south as Richmond, Va., with branches in New York, Philadelphia, and Boston. Mr. Smith formerly handled the Sunbeam car.



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Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
231-241 West 39th Street, New York City

EDITORIAL

David Becroft, Directing Editor
Donald McLeod Lay A. Ludlow Clayden Sydney Oxberry
J. Edward Schipper, Special Representative, Detroit

BRANCH OFFICES

Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—95 Fort Street, West, Phone Main 1351
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Patriotism and Class Taxes

THESE are days when we must discriminate between protesting against class taxation and a lack of patriotism.

That patriotism is best which will oppose with every ounce of energy methods of taxation which are not in accord with the spirit of democracy. Any citizen fearing to assert his rights at such a time would be evidencing the characteristics of a citizen of an autocratic country rather than a democratic one.

Automobile Industry Patriotic

There is no lack of patriotism in the automobile, truck and motorcycle industries in opposing the 5 per cent tax. These industries are not exempt from the taxes falling on kindred industries. They do not object to them. They will pay them willingly; but they do object to a discriminating tax on the automobile industry, which in the present war has taken a place undreamed of 5 years ago. Motor apparatus is to-day a necessity of war. The automobile industry stands ready and is giving freely of its services. For this it is specially taxed.

Apparently too many on the Ways and Means Committee must gage the industry by the financial statements of one or two companies. This committee does not realize that 80 per cent of the automobiles are manufactured by ten companies. It overlooks the fact that there are over 400 companies that are not large producers, which in short produce but 20 per cent of the output.

The 5 per cent tax falls on all alike.

Instead of encouraging the industry, or being content with taxing its profits, the Ways and Means Committee aims at taxing the processes of the industry, of injuring it, crippling it, instead of keeping the industry in a healthy state. The healthier the automobile industry is the greater war revenue will it pay the government.

National Standards

THAT the S. A. E. standards committee meeting last week really put the government stamp on the work of this body is apt to pass unnoticed perhaps, because the great amount of work accomplished for the government by the society has been done so quickly, so thoroughly and so effectually.

Truck Specifications An Example

The military truck specifications, for example, do not come up for vote before the committee, yet they represent one of the biggest achievements of the society. The aeronautic standards are wholly in government interests, for the government is now almost the only user of aircraft.

The work of establishing and maintaining the S. A. E. steel specifications progresses smoothly; it has become almost routine, yet the existence of those steels is helping the government in obtaining all kinds of automotive machinery to an extent that is hard to estimate at its proper value.

No engineering body in the world has done more to help its government in time of stress than has the S. A. E. No standardization work has ever been carried out with greater speed and thoroughness and no society has ever risen to an occasion more quickly and readily. Breadth of view, quickness of perception and rapidity of action are the characteristics of the automotive engineer and we find them all embodied in the standards committee of the S. A. E.

Better Division Work

THE divisions of the S. A. E. standards committee are to be congratulated upon an increasing thoroughness in their work. It is noticeable that in the main meetings of the parent committee there is decreasing argument over the detail of divisional recommendations. The committee may ask for more, for an extension of some tabulation, for an elaboration of some point, but they do not attack the division's conclusions nearly so often as formerly.

Rapid Standardization Work

This is partly experience. There are many men in the committee now who have years of experience in standardization, they have acquired the best mental attitude, they soon discover how to get after any particular problem. Like all other work, standardization improves with practice and the S. A. E. now contains over 100 expert standardizers who tackle each fresh problem more easily than its predecessor. Increasing efficiency in handling work has characterized the divisions for several years past, and the present pitch attained is highly satisfactory.

Many New Standards

New S. A. E. Standards

Accepted by Committee but Not Yet Submitted to Whole Society

AERONAUTIC

Subject to War Department Approval

Aeroplane controls
Hard wire ends
Flexible cable ends
Galvanized non-flexible cable ends
Turnbuckles
Marking of fuel and oil pipes
Elimination of gage numbers for wire and sheet in favor of fractions of inch dimensions
Thimbles
Engine supports
Use of English measuring system
Metric sparking plug
Tachometer drive
Safety belt

BALL AND ROLLER BEARING

Metric sizes for three types of thrust ball bearings

CHAIN

Pitch of silent type chains
Widths of silent type chains

ELECTRICAL EQUIPMENT

Flange mountings for generators
Flange mountings for starting motors
Ignition distributor mounting

LIGHTING

Head-lamp nomenclature
Revision of some data sheets to accord with new nomenclature

RESEARCH

Car performance test

TIRE AND RIM

Rims and fittings for demountable solid truck tires
Inflation pressure table for pneumatic tires

Much Work of National Importance Characterizes Meeting of S. A. E. Standards Committee—24 New Standards and Many More in Progress

Other Work Done

MARINE

Approval of a number of S. A. E. standards for motor marine work

SPRINGS

Recommendations for certain revisions in official military truck specifications

TRUCK STANDARDS

Recommendations in connection with drafting of military truck specifications
Included in this is work done by several other divisions at the request of the military authorities

Progress Reports Accepted

ENGINE

Poppet valve sizes—to be examined to see possibility of application to aero and marine work

IRON AND STEEL

Finish and temper standards for sheet steel

THE first meeting of the Society of Automotive Engineers' standards committee since the society has officially changed its name and broadened its field to include aeronautic, tractor and marine engineering was held at Cleveland on May 3. Reports were received from a majority of the divisions, whose recommendations were in most cases accepted with distinctly less argument than usual. Probably this is due to the fact that the division work has been done very thoroughly.

Prominent among the reports was that of the aeronautic division, whose work is of particular importance at the present time. Practically all recommendations of this committee are submitted to the War Department for approval before final acceptance. In fact, the division is at present doing what amounts to purely government work. The report was accepted with two exceptions by the committee, and covers a large variety of aeroplane parts, not being by any means limited to the engine.

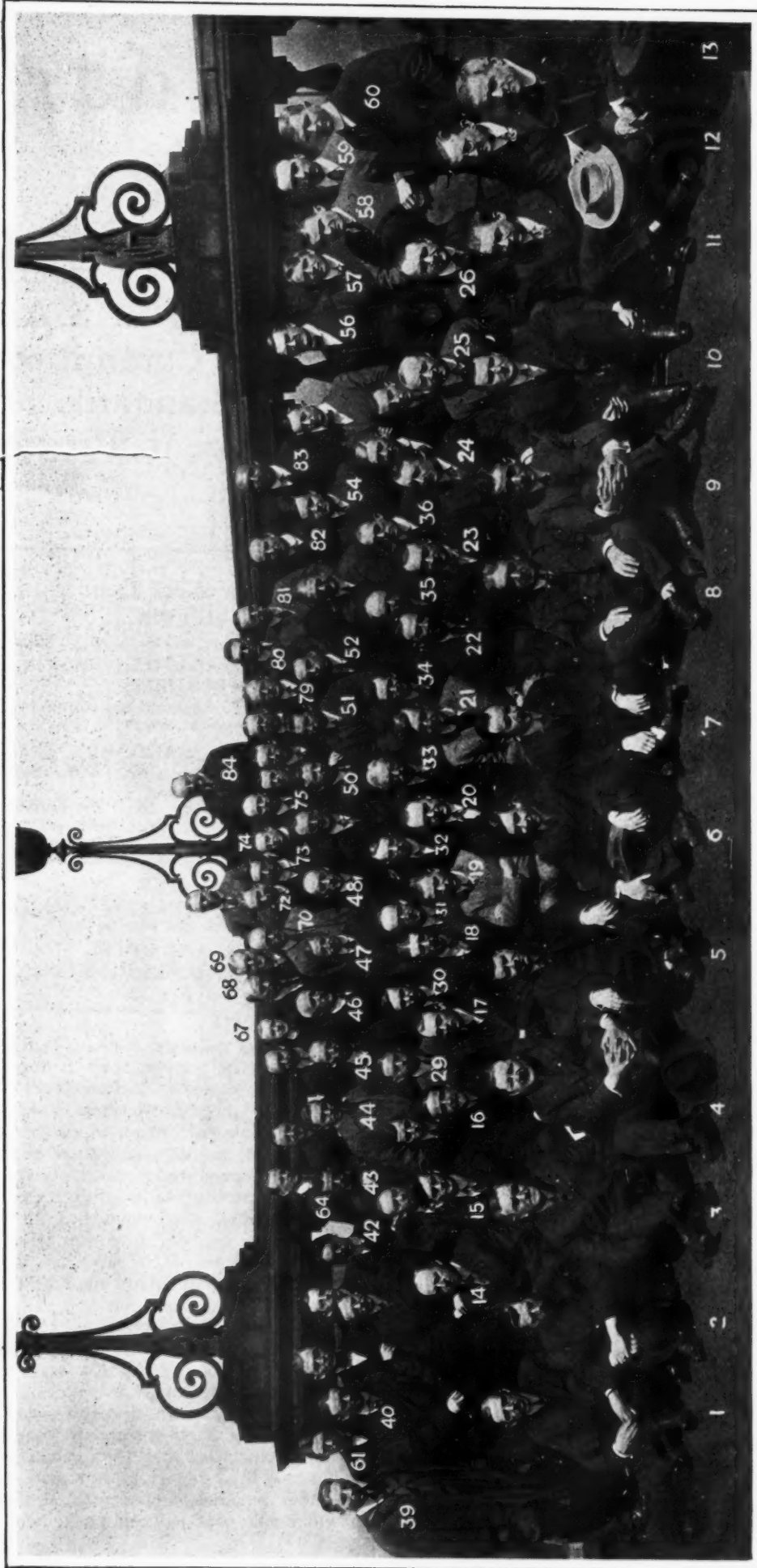
The recommendations of the research division regarding a standard form of economy and acceleration test for automobiles was finally accepted. This, it will be

remembered, has been referred back to the division on several occasions. In its present form it does not differ very greatly from the report of last summer, except that the apparatus for the acceleration test is entirely new. Tests were made in the fall, using a system which was expected to give good results. In actual practice some very surprising and unexpected results were obtained and some faults discovered in the timing scheme. A much more delicate apparatus, which has the advantage of being quite simple, was designed and made and was tried by several members of the division, and in presenting the report Chairman Gallup showed slides giving the results of some of the tests made.

The apparatus, although simple and inexpensive, is of such delicacy that it will undoubtedly enable engineers to make still closer study of the effects of carbureter adjustments, ignition variations, etc.

It is almost 2 years since the division commenced the study of this particular problem, and at each stage the result of the division's work has been discussed in open meeting. Thus the final report as now accepted represents an enormous amount of concentrated thought. It should be of extremely practical and permanent value.

Automotive Standards Convention, May 4, 1917



1—M. W. Hanks, Westinghouse; 2—H. R. Cobleigh; 3—W. Tuttle, Van Blerck Motors; 4—Jos. Van Blerck, Van Blerck Motors Co.; 5—E. R. Abbott; 6—D. S. Hatch, Editor Motor Age; 7—C. S. Crawford, Premier; 8—Berne Nadell, Stewart-Warner; 9—E. G. Gunn, Premier; 10—A. D. T. Libbey, Splitdorf; 11—J. R. Cautley, Frasse; 12—C. C. Carlton, Firestone; 13—C. B. Whittlesey, U. S. Rubber; 14—A. J. Slade; 15—F. Jehle, Aluminum Castings Co.; 16—Theo. Marburg, Marburg Bros.; 17—F. J. Jarosch, Bearings Co. of Amer.; 18—A. L. Clayden, Eng. Editor, THE AUTOMOBILE; 19—K. W. Zimmerchied, General Motors; 20—Coker F. Clarkson, Gen. Mgr., S. A. E.; 21—J. G. Uts, Chairman, Standards Committee; 22—Wm. M. Britton, Quartermaster's Dept.; 23—C. W. McKinley, Willys-Overland; 24—W. P. Kennedy; 25—

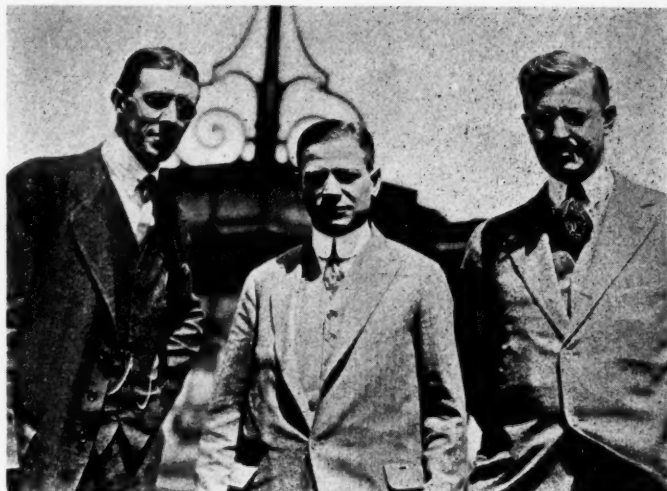
C. F. W. Rys, Carnegie Steel Co.; 26—Geo. Moskovics, George Roller Bearing Co.; 29—O. F. Conklin, Remy Elec. Co.; 30—Frank Conrad, Westinghouse; 31—W. E. McKechnie, Cadillac; 32—H. J. Garceau, Warner Gear; 33—W. L. Bliss, U. S. Lighting & Heat; 34—W. A. Frederick, Continental Motors; 35—F. A. Whitten, General Motors; 36—L. C. Fuller, Fuller & Sons; 39—J. E. Schipper, Tech. Editor THE AUTOMOBILE; 40—Prof. D. L. Gallup; 42—E. W. Miller; 43—C. B. Veal, Purdue Univ.; 44—Paul Bauder, National Elec.; 45—W. C. Keys, Cadillac; 46—Prof. R. M. Anderson, Master Carbureter; 47—C. E. Clemens, Perfection Spring; 48—E. H. Ehrman, Chicago Screw Co.; 49—P. J. Batenburg, Four-Wheel Drive; 50—A. F. Milbrath, Wisconsin Motor; 51—A. C. Woodbury, Recorder, S. A. E.; 52—W. H. Knowles, Saxon;

54—J. C. Manternach, Standard Welding Co.; 56—J. G. Perrin, Timken-Detroit Axle; 57—Fred Duesenberg, Duesenberg Motors; 58—J. E. Diamond, Aluminum Castings Co.; 59—E. Freed; 60—E. W. Weaver, Ferro; 61—R. E. Plimpton, S. A. E.; 64—M. W. H. Wilson, Cadillac; 65—C. S. Whitney, Willard; 66—R. J. Broege, Buda Co.; 67—R. S. Lane, Hyatt; 68—T. V. Buckwalter, Penn. R. R.; 69—L. P. Kalb, Kelly-Springfield Truck; 70—R. J. Nightingale, Willard; 72—H. C. Snow, Winton; 73—C. Carson, Johns-Manville; 74—Bruce Ford, Electric Storage Battery Co.; 75—J. E. Hale, Goodgear; 79—W. M. Newkirk, Wm. and Harvey Rowland; 80—W. A. Christ, Dayton Eng. Lab. Co.; 81—W. H. Palmer, Jr., Elec. Storage Battery Co.; 82—E. E. Sweet, Cadillac; 83—Jos. Blum, Blum Motor Lighting Co.; 84—A. C. Bergman, Perfection Spring Co.

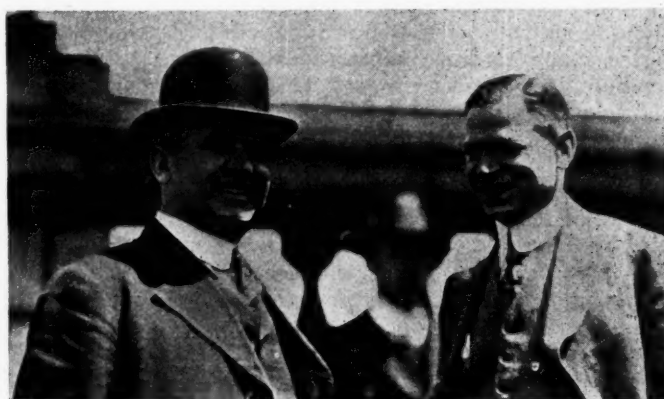
One of the hardest worked divisions of the last year has been that of the truck standards, although the results do not appear conspicuously in report form. Practically the whole of their attention has been given to assisting the War Department in preparing the recently issued standard specifications for military trucks, in which work they have been assisted by the electrical equipment division and the springs division. Certain points in connection with the specifications are still under discussion, and the recently created transmission division of the standards committee spent a good many hours May 2 and 3 discussing the best methods for meeting the specification requirements with respect to gear ratio. There was no formal report presented from the truck standards division, but K. W. Zimmerschied made a motion to the effect that the standards committee as a whole ratified and supported the work done by the truck standards and other divisions in connection with the military specifications, the motion being accepted unanimously. On a second motion, also proposed by Mr. Zimmerschied, the committee sent a telegram to H. D. Church, chairman of the truck standards division, who was prevented from attending by very serious illness, congratulating him on the work done and expressing their sincerest sympathy and hopes of his speedy recovery.

Designation of Military Truck

In discussing the military specifications it was suggested that the terminology be changed by the War Department and that the trucks be called light and heavy instead of $1\frac{1}{2}$ and 3 ton. It was pointed out that the capacities called for are considerably in excess of the nominal capacities, which makes a military truck essentially a heavier job than a commercial truck of the actual capacities of $1\frac{1}{2}$ and 3 tons. Mr. Britton, speaking from his viewpoint as representing the department, said that the point was well taken and the idea a good



Right, J. G. Utz, chairman standards committee; K. W. Zimmerschied, General Motors, and left, A. Ludlow Clayden, both past chairmen standards committee



Berne Nadall, Stewart-Warner Speedometer Corp., and K. W. Zimmerschied



W. A. Frederick, Continental Motors Corp., and W. E. McKechnie, Cadillac Motor Car Co.

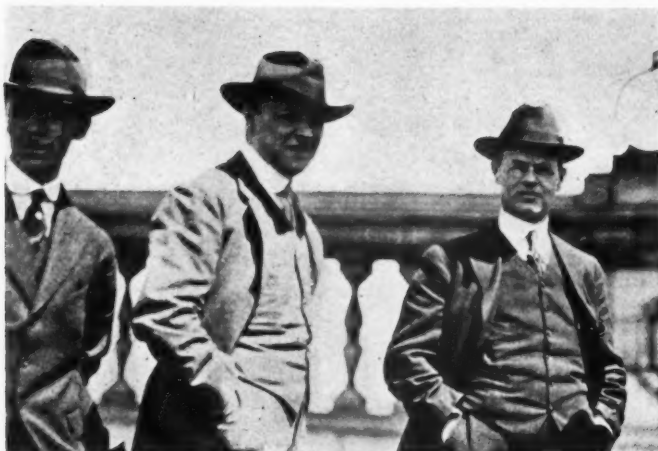


C. S. Crawford, Premier Motor Corp.; Prof. R. M. Anderson, Stevens Institute, and Prof. D. L. Gallup, Polytechnic Institute

one. A resolution is now being drafted by the Society management for submission to the Department, drawing attention to commercial advantages which would accrue if the naming of the trucks was changed.

Another division which has been extremely active is the tire and rim committee, which proposed a standard form of fitment for the demountable tire called for in military truck specifications. The design, which was accepted without discussion, enables tires of all sizes called for in the specifications to be attached to the wheels with a minimum number of different parts. The inside and outside flanges are the same, all the wedges are identical, the bolts can be put in either way around, and so on.

Probably the greatest amount of discussion took place concerning the recommendations of the electrical equipment division with respect to standard flanges for generator and starting motor mounting. The recommendation was presented with the rider that it was not the idea of the division that these mountings should replace all other types, but that where flange mountings were used the flanges should conform to the dimensions. Obtaining agreement, even within the division, upon these flanges has not been easy, probably because their dimensions are controlled by available clearance rather than by any fundamental engineering requirement. This is particularly the case with regard to the starting motor, and on a number of engines there actually is not room for a flange mounting since the body of the motor has to lie so close to the side of the crankcase.



W. C. Keys, Cadillac; C. F. W. Rys, Carnegie Steel, and W. M. Newkirk of William & Harvey, Inc.

The division obtained drawings of a very large number of engines on which they could lay out flanges of different dimensions, and it was soon discovered that a flange to suit all cases was an impossibility. One or two engine manufacturers expressed willingness to lay out any new designs so as to suit whatever standard flange might be adopted, and those now standardized probably represent the best which can be done at present toward providing flanges which will fit any engine. The report was accepted after considerable discussion.

Most of the other reports were short. The ball and roller-bearing division offered a table of metric sizes for thrust bearings, which was accepted.

The lighting division recommended a revision of certain data sheets in order to conform with the lamp nomenclature, part of which was accepted in January, and

an additional series of terms accepted at this meeting. The report of the springs division dealt entirely with matters relating to the military specifications recommending certain revisions.

The chain division, which has lain dormant for a considerable period, reported that agreement had been obtained regarding the standardization of pitch together with sufficient approach to a width standard to permit a chain case to be designed so that it would fit any chain.

The other reports were mainly matters of progress. The engine division again presented a tabulation for standard poppet-valve dimensions, and this was referred back for consideration by the marine and aeronautic divisions to see whether it would be possible to evolve one table covering marine, automobile and aviation requirements.

The starting battery division had its report accepted provisionally only owing to an apparent possibility that the recommended terminal post might be covered by a patent.

The iron and steel division reported progress toward the standardization of temper and finish of sheet steel.

The marine standards division, which has only been in existence a very short while, confined its report to an approval for marine purposes of a large number of existing S. A. E. standards.

The data sheet division told how it proposed to rearrange the data books so as to make reference easier, and the suggested scheme was approved. There was a little discussion as to the advisability of having a larger book.

In the following pages are presented detailed reports of the different divisions, with notes on the discussions on the reports. The principal new standardizations are dealt with this week, and the remaining reports will be published next week.

Rapid Work in Aeronautic Standardization

F. S. DUESENBERG read the report of the Aeronautic Division. In the discussion it was brought out that the Stick control is largely favored for light machines and the Deperdussin control, commonly known as the Dep, is favored for heavier machines. It was also mentioned that standard sizes of engine bed timbers of 12, 14 and 16 in. would also be desirable.

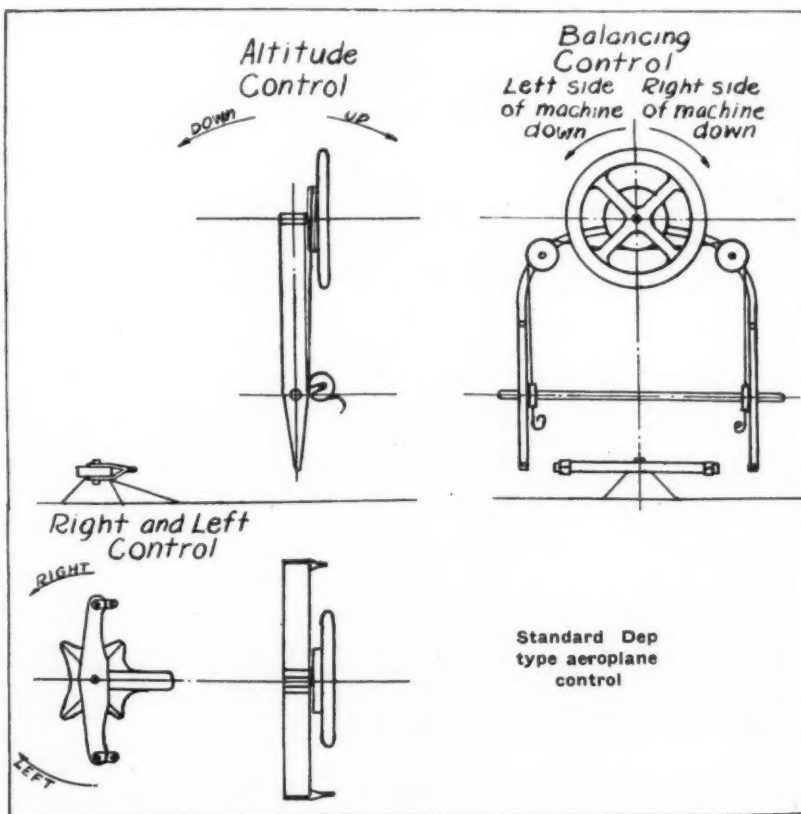
Probably one of the most important steps in view of the formative condition of the aeronautic industry was the decision to adopt the English or inch system of measurement because of the requirements of the United States Army and Navy service.

A letter was read from R. S. Griffin, engineer in chief of the United States Navy Bureau in Washington, in which he stated that the following suggested standards taken from the report are acceptable to the navy department:

- 1—English system of measurement.
- 2—Marking oil and fuel lines.
- 3—Elimination of gage numbers.
- 4—Engine supports.
- 5—Spark plugs.

He also suggested that a rubber tube be used to connect the gasoline tank to the carburetor and the Bureau has asked for specimens of the wire and turnbuckle fittings described in the report. In other words, the bureau is still questioning the wire tensile strengths, thimbles, turnbuckles and tachometer shaft drive.

Controls—It is found that these two types of control, namely, the Deperdussin (Dep)



and Stick controls are necessary to cover most types of plane in military use. The standards specify that particular movements produce particular effects, but do not specify the connections, since these vary a great deal in practice.

Details for Planes

Hard Wire Loop—This consists of an oval coil of wire through which the hard wire is slipped, bent in the form of a loop, again inserted, and the end bent over against the coil. The whole is then soldered. This is identical with the present British standard.

Flexible Cable Ends—The sketch shows the cable end wrapped around a "standard thimble." The length of splice from pointed end of opening in thimble was represented by "splice plus or minus 1/4 in." The end of the splice is wrapped with a serving of shellacked harness thread. Dimension A represents the distance from end of opening in thimble to end of serving.

Diameter of Cable	Length of Splice	Number of Tucks	Length of Serving	Full Strength of Cable
3/32 7 x 14	1 1/4		1	1 1/2
1/4 7 x 19	1 1/2	3 over	1	1 1/2
5/32 7 x 19	1 3/4	core buried	1 1/4	1 1/2
3/16 7 x 19	1 7/8	4 under	1 1/4	3/4
7/32 7 x 19	2 1/8		1 1/4	3/4

Galvanized Non-Flexible Cable Ends—The cable end is wrapped about a thimble, with a total length of splice indicated by L; 0.041 in. soft steel wire is to be used for wrapping, and the sketch indicates two spaces left between convolutions of the wrapping wire, width of the spaces being indicated in the table. The accompanying table gives the sizes and strengths:

Diameter of Cable	L	Space	Wind	Full Strength of Cable
1/16 1 x 19	1 1/2	1/4	1	500
3/32 1 x 19	2	1/4	1 1/4	1100
1/4 1 x 19	2 1/2	1/4	1 1/2	2100
5/32 1 x 19	2 3/4	1/4	2	3200
3/16 1 x 19	3	3/16	2 1/4	4600
7/32 1 x 19	3 1/2	3/16	2 1/4	6100
1/4 1 x 19	4	1/4	2 1/2	8000

Thimbles—It was voted to approve, subject to approval by the departments of War or Navy, thimbles for wire ends as shown by Plate No. 7 following page 118, First Annual Report of the National Advisory Committee for Aeronautics (1915). These thimbles will be shown by appropriate drawings. The sizes are indicated roughly by the following table:

Size of Rope	Thickness of Thimble	Width of Eye	Length of Eye
1/16-3/32	0.075	0.35	0.70
1/4	0.12	0.35	0.70
5/32	0.17	0.40	0.80
3/16	0.21	0.50	1.00
7/32	0.24	0.60	1.20
1/2	0.27	0.70	1.40
9/32	0.30	0.80	1.60
5/16	0.33	0.90	1.80
3/8	0.39	1.00	2.00

Turnbuckles—Detail dimensions of both short and long types are being studied by a sub-division consisting of Chairman Manly and Capt. Clark. The following main dimensions are recommended for immediate adoption:

(With either two eye ends or one eye and one yoke end.)	Short	Long
Length of barrel.....	2	4
Length between eyes:		
With threads flush with ends of barrel.....	4	8
With maximum extended.....	4-3/16	8-3/16
With minimum extended.....	3 3/4	5 1/2

Strength (Lbs.)	Short	Long
S. A. E. Numbers		
1.....	500	500
2.....	1000	1000
3.....	1500	1500
4.....	2000	2000
5.....	2500	2500
6.....	3000	3000
7.....	3500	3500
8.....		4000
9.....		4500
10.....		5000
11.....		6000
12.....		7000
13.....		8000
14.....		9000
15.....		10,000

Marking Pipe Lines—Gasoline lines should be marked with red stripes 1/2 in. wide painted around the pipes 24 in. apart, care being observed that there is a stripe near each end of the pipe.

The oil lines to be marked similarly but with white stripes.

Elimination of Gage Numbers—Sheet metal is to be specified by thickness in decimal fractions of an inch. Rods, wires and cables are to be specified by diameter in decimal fractions of an inch. Tubes are to be specified by outside diameter in inches or fractions and thickness of wall in decimal fractions of an inch.

Engine Supports—The division recommends the following table of dimensions, omitting all reference to sizes of bolts:

Distance between timbers.....	12	14	16
Width of bed timbers.....	2	2 1/4	2 1/2
Distance between centers of bolts..	14	16 1/4	18 1/2

Basic System of Measurements—In view of the fact that the Army and Navy Departments are not both in favor of adopting the metric system, and further in view of the necessity of arriving at standards that will mean the least possible delay in the production of airplane parts, this division recommends definitely to use the English system of measurement except in isolated cases such as spark-plug threads where the metric system is desirable in order to effect interchangeability with some well established standard.

Spark Plug Dimensions—The following dimensions for spark plugs were agreed upon:

Thread: 18 mm., 1 1/2 mm. pitch.

Form of thread: International standard (Same as U. S. standard only with one-half as much truncation at root of thread).

Gasket shoulder to end of shell: 5/8 in.

Hexagon: 1 in. across flats.

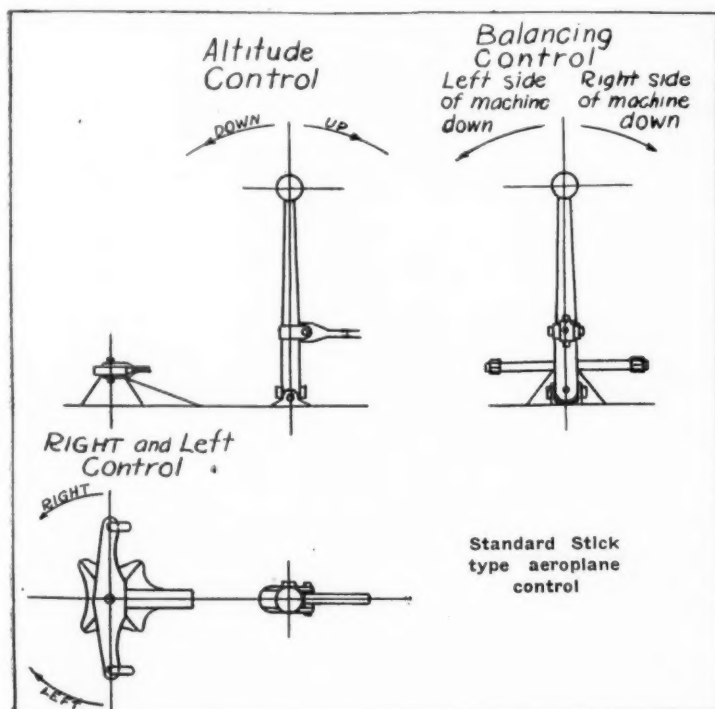
The question of thread tolerances was deferred.

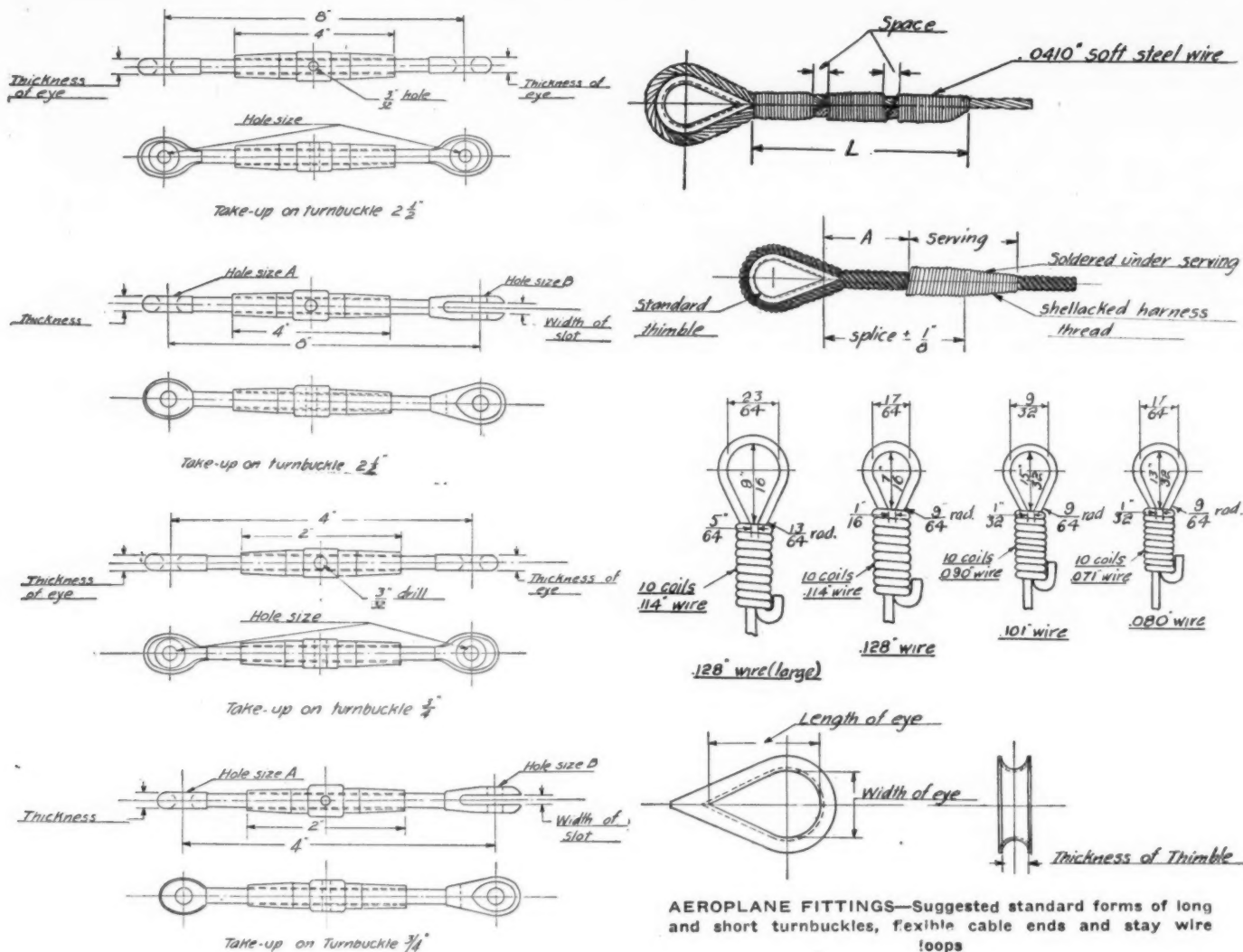
Propeller Hubs—The design of propeller hubs of various sizes should be based upon pounds-feet torque and not on horsepower.

Direction of Engine Rotation—The direction of engine rotation is normal when the final power delivery member of the engine rotates anti-clockwise, viewed facing the power delivery end. Opposite rotation is anti-normal.

Approval of Existing S. A. E. Standards—The following list of existing S. A. E. standards was approved for aeronautic practice:

Screws and Bolts: (A committee has been appointed to recommend supplemental standards) Heat treatments; test





specimens; ball bearing sizes; throttle levers; magneto dimensions, and cotter pin sizes.

Aeronautic Work Still in Progress

A sub-division consisting of Messrs. Vincent, Crane and King has been appointed to take up the subject of pipe fittings. Data are also being collected regarding high grade alloy steel tubing. Some revision of the propeller shaft end dimensions is under consideration. Prof. Z. Jefferies, Aluminum Castings Co., and K. W. Zimmerschied, chairman of the iron and steel division, have been requested to submit suggestions in regard to aluminum alloy specifications.

Referred Back to Division

Three recommendations contained in the report were referred back to the division. The first of these suggested certain standard sizes for tires and rims; the second was a suggested standard design for a tachometer driveshaft, and the third was an acceptance for aeronautic work of the existing iron and steel standard specifications.

J. E. Hale, Goodyear Tire & Rubber Co., inquired regarding the tire sizes which he said are all new. On the other hand, the 26 by 4 has been popular with production running into the thousands and yet these are not mentioned in the report. Duesenberg stated that in the committee meeting no one had made any objections to the tire sizes, although no tire men were present. Hale stated that none of these tires are made but this is a matter which should be considered, and although the situation is by no means grave owing to the relatively small production, it would be a question of making matters much more simpler if existing sizes could be used. Duesenberg pointed out that the 32 by 4 1/2 tire is easily secured and is the normal size for the popular 33 by 5 oversize tire used extensively in racing.

In view of this discussion, Chairman Utz stated that he was willing to receive a motion to the effect that the report be amended so as to exclude the paragraph on tires and rims. This amendment was passed with a suggestion from one of the members that the thickness of the rimstock also be inquired into, because of the difference between that recommended and that now used.

Another matter in connection with the report of the aeronautic division was brought up with regard to the specifications on sheet metals. These were stated to be not full enough, particularly as regards steels, which had to be bent on themselves before heat-treated. Metallurgist Zimmerschied of the General Motors Co. was one of those who concurred in this, and the result was the addition of another amendment excluding that part of the report dealing with the iron and steel specifications, both amendments being carried without any dissent.

Standardizing Tachometer Drive

C. M. Carson, consulting engineer of the H. W. Johns-Manville Co., drew attention to the matter of standardizing tachometer drive, which is under consideration. He stated that where flexible cables of a length up to 16 ft. long are used, the bends in the cable are apt to change the length of the shaft to such an extent that it is doubtful if the keyway suggested is sufficient to hold the engaging members of the driveshaft in place. Berne Nadall of the Stewart-Warner Speedometer Co. concurred in this and others pointed out that the wall is rather thin in the suggested speedometer drive end, whereas in aeronautic work it is necessary to have a rigid fixture at this point. This discussion resulted in the three amendments to the report, which was finally accepted with these three amendments; namely, that the matters of tires, iron and steel specifications, and tachometer drive should be turned back to the division for further review.

Evolve Demountable Tire Attachment

Improved Design Standardized for Military Truck Equipment

THE subject of solid tire and demountable rim equipment for military trucks was discussed at length and Mr. Britton made it clear that the Quartermaster General's office is very desirous of arriving at a standard by co-operative means. As a result of the discussion, the entire Tire and Rim Division concurred in the following resolution:

WHEREAS, assuming that the Government considers the demountable solid tire as a military necessity; therefore,

BE IT RESOLVED that the Tire and Rim Division of the Standards Committee of the Society of Automotive Engineers recommend that the standard specifications for the demountable tire and rim equipment and fastenings for the 1½ and 3-ton military trucks shall be as follows:

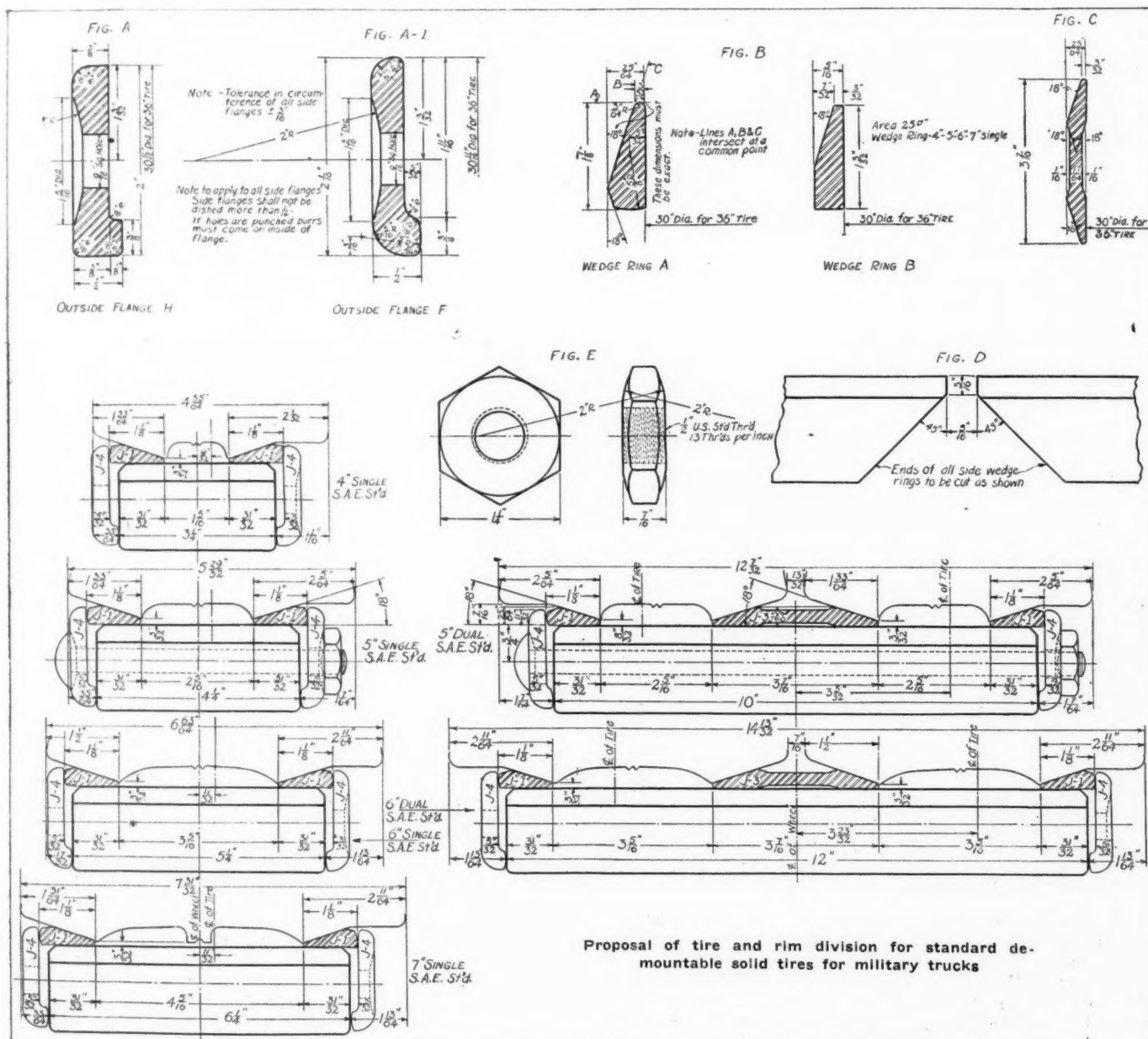
1—Felloe bands and nominal tire diameters are to conform to S. A. E. standard specifications.

2—A type of tire channel shall be used which will permit of one size of wedge ring being used for both single and dual equipment, regardless of sectional size; also one standard section of center wedge ring for use between dual tires of all sectional sizes.

3—Side flanges shall be used, having the S. A. E. standard bolt circles. Flanges shall be provided with bolt-holes in accordance with S. A. E. standards;

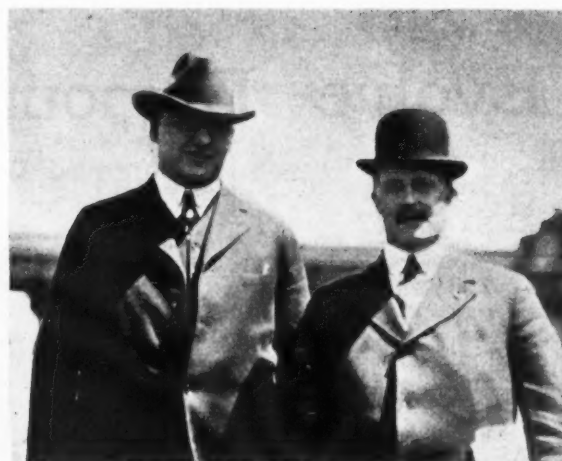
36 in.—12 holes,
40 in.—15 holes.

These flanges shall be provided with bolt holes 9/16 in. square, with spherical counter-boring which will permit these flanges to be used for either inside or outside flanges. See Figs. A and A-1, hereto attached.





1—C. S. Crawford, Premier. 2—E. G. Gunn, Premier. 3—W. A. Chryst, Delco. 4—C. Carson, Johns-Manville. 5—W. E. McKechnie, Cadillac



A. C. Bergman, Perfection Spring Co., and W. P. Kennedy

4—Side wedge rings shall be as per Fig. B attached hereto, or equivalent.

5—Center wedge rings shall be as per Fig. C attached hereto, or equivalent.

6—Ends of all side wedge rings shall be cut as per Fig. D, attached hereto, or equivalent.

7—All nuts shall be as per Fig. E, attached hereto, or equivalent, preferably case-hardened.

8—Bolt heads shall be made to conform to the square hole and the spherical counter-boring in the side flange, Fig. A, and the lengths shall be according to the following table:

Tire Section	BOLT LENGTHS	
	Single	Dual
4	4 5/8	9 1/2
5	5 5/8	11 1/2
6	6 5/8	13 1/2
7	7 5/8	15 1/2

All bolts 1/2 x 13 U. S. F. Threaded 1 1/4 in. minimum.

9—Contours of the under side of tire channels shall be equal to or interchangeable with the contours shown on Fig. G, attached hereto.

10—It is understood that the present tire sizes in the military truck specifications are:

36 by 4-in. single,	36 by 7-in. single,
36 by 5-in. single,	36 by 5-in. dual,
36 by 6-in. single,	36 by 6-in. dual.

The tests of the tire and rim makers on types and dimensions of pneumatic tire rims have not been completed and the subject was tabled for the next meeting.

The tests of the tire and rim makers on the thickness of pneumatic tire rims have not been completed and the subject was tabled for the next meeting.

In reference to the carrying-capacity and inflation-pressure of pneumatic tires a letter presented before the division, written by C. C. Carlton, as chairman of the executive committee of the C. A. T. M. A., to K. W. Zimmerschied, chairman of the tire and rim division, was read. This letter is the report of the final conclusions of the C. A. T. M. A. on carrying-capacity and inflation-pressure of pneumatic tires.

Upon motion duly seconded, put and carried the table presented by Mr. Carlton was adopted as the proposed standard of the S. A. E. and is as follows, the loads per tire and the pounds per square inch inflation being maximums:

3-in.—	375 lb. per tire,	45 lb. inflation
3 1/2-in.—	570 lb. per tire,	55 lb. inflation
4-in.—	815 lb. per tire,	65 lb. inflation
4 1/2-in.—	1,100 lb. per tire,	75 lb. inflation
5-in.—	1,300 lb. per tire,	80 lb. inflation
5 1/2-in.—	1,700 lb. per tire,	85 lb. inflation
6-in.—	2,000 lb. per tire,	90 lb. inflation

The members of the division were not ready to take a final vote on pneumatic tires for motor trucks, as the data were incomplete.

In view of the previous action of the division, which was not approved by the Society as a whole, it was decided to table the matter of carrying-capacities for solid tires for the present.

The report was accepted by the division in its entirety without discussion.

Electrical Equipment Report Accepted

After a large amount of preliminary work extending over many months, the electrical equipment division has prepared proposed standards for flange mountings for generators and starting motors. It is not intended that this type of mounting shall be standardized to the exclusion of other mountings.

The illustration shows the dimensions as proposed for two sizes of generator flanges and two sizes of starting motor flanges. The drawings were prepared hastily in order to submit to manufacturers for criticism in advance of the May meeting of the standards committee, and contain some errors.

The length *S* is 1 in. for the No. 1 size and 1 1/4 in. for the No. 2 size. The generator shaft should be slightly reduced in diameter at the shoulder near dimension *R*. At the upper left-hand side of the end view of the generator flange, the dimension 1/16 in. should be the distance between centers for radii *E* and *I*.

The generator flange is made with a finished pilot and also with slotted holes for adjustment. This makes the same design available for use with either fixed or adjustable center distances for gears or sprockets.

The ignition distributor mounting shown is also submitted for adoption. It is suitable for use when the distributor is mounted either on the engine or on the generator. The shaft diameter is omitted because of difference in practice. The two diameters now in most common use are 0.49 in. and 0.499 in.

Spring Specifications for Military Trucks

The springs division at its meeting April 26 went over the paragraphs having to do with springs in the War Department truck specifications. The following paragraphs were approved as standing:

258	264	273	279 (90)	279 (98)
259	265	274	(91)	(99)
260	269	275	(93)	(100)
262	270	276	(94)	(101)
263	272	277	(97)	12 of appendix

Paragraph 259 is based on tests made by the Perfection Spring Co.

The following suggested changes are arranged according to paragraph numbers:

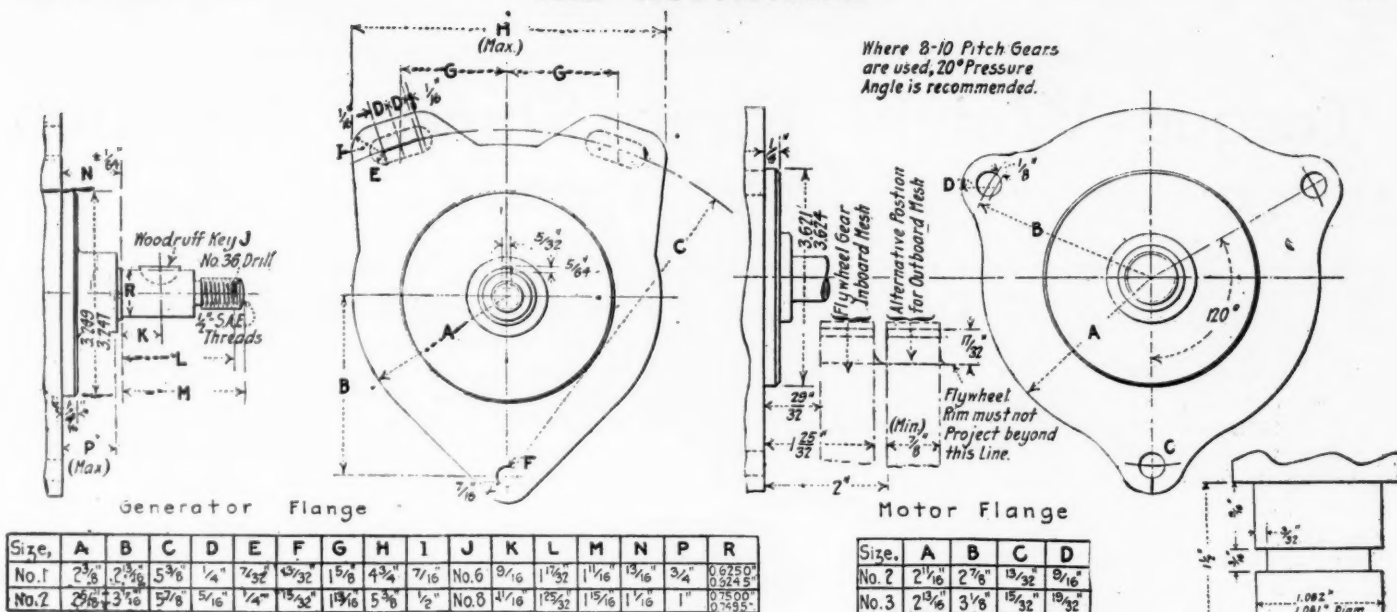
261. Transpose second sentence to read "Bushings must conform to S. A. E. standards of wall thickness and have suitable lubricating channels."

263a. Omit "Rear" in next to last sentence, making it read "Spring shackles must be in tension."

266. In fourth line change "head" to "heads."

267. Insert "at least" in third line, making it read "properties at least equal to the following." The following changes are suggested to agree with tests of the various steels specified:

Elongation 16.5 per cent in 2 in.



Reduction of area 55 per cent (Omit "in 2 in.")
Brinell hardness 250-295.
Omit scleroscope hardness.

268. Add a sentence to the end as follows: "Nuts may be of carbon steel and dimensions must conform to S. A. E. standard for spring clip nuts." See data sheet 49g.
271. In last sentence change "steel buffers" to "spring buffers."
278. In first line change "power" to "driving thrust."
279. (89) Omit "and scleroscope."
(92) Insert before (92) the following: (Dimensions called for in (92 and 93) shall be given as shown in S. A. E. spring purchase specifications).

Change to read: "Length of spring under load, center bolt to center of eye or to bearing point."

- Add after (94) (94a) Total weight in pounds carried by springs with rated load on trucks:
(a) Front end. (b) Rear end.
(95) Change 95 to 95a, or renumber, and insert:
Add (95) Length of spring seats:
(a) Front. (b) Rear.
(96) Change to read as follows: "Number of leaves, thickness of spring and of individual leaves, counting main leaf as numbered."

Meeting of National Advisory Committee for Aeronautics, Aeroplane and Motor Manufacturers



Those in the group who are members of the Aircraft Manufacturers' Assn. are: Sidney D. Waldon, formerly with Packard and Cadillac; Inglis M. Uppercu, of Cadillac; A. H. Flint; B. A. Guy, Curtiss Aeroplane Co.; G. H. Houston; C. M. Keyes, Curtiss Aeroplane Co.; H. B. Mingle, W. B. Judkins; F. L. Morse, Thomas-Morse Aircraft Corp.; F. H. Russell, Burgess Co.; J. W. Scott, Curtiss Aeroplane Co.; G. Thomas; Benjamin L. Williams, Secretary, Aircraft Manufacturers' Assn.; and Charles F. Willard

Others prominent in the group are: Dr. Charles D. Walcott, chairman; Dr. S. W. Stratton, secretary; F. S. Duesenberg, Duesenberg

Motor Corp.; Dr. Joseph S. Ames, Dr. Charles F. Marvin; Dr. Michael I. Pupin, Dr. W. Christmas, Christmas Aeroplane Co.; G. R. Cockley, International Airship Corp.; Henry M. Frauenthal, New York Aero Construction Co.; E. F. Gallaudet, Gallaudet Aircraft Corp.; William H. Hutton, formerly Timken-Detroit Axle Co.; Glenn L. Martin, Wright-Martin Aircraft Corp.; Israel Ludlow, C. T. Moore, Seattle, Wash.; Henry Harrison Suples, Major C. S. Wallace, Lee S. Wallace, United Eastern Aeroplane Co.; Harry D. Westcott, New York Aero Construction Co.; Samuel Quinn, International Airship Corp.; Eugene S. Robinson, Charles B. King and Warren S. Eaton, New York Aero Construction Co.

Torque-Weight Ratio Shows Variation at Low Speeds

Study of Typical Cars Having Different Number of Cylinders Shows Effect of Weight and Gear Ratio

By J. Edward Schipper

AS described in A. L. Clayden's article last week, the combined units of engine torque, gear ratio, and car weight spell a large part of the story of performance. Engineers have long since become acquainted with the fact that one of the primary demands of the American public is for acceleration and hill climbing ability. The nature of the country, with long, straight roads the exception and a psychological demand for getaway the rule, makes this probably quite a natural state of affairs. At any rate, all efforts to change it by educating the public to gear shift and by various other methods have not been a success.

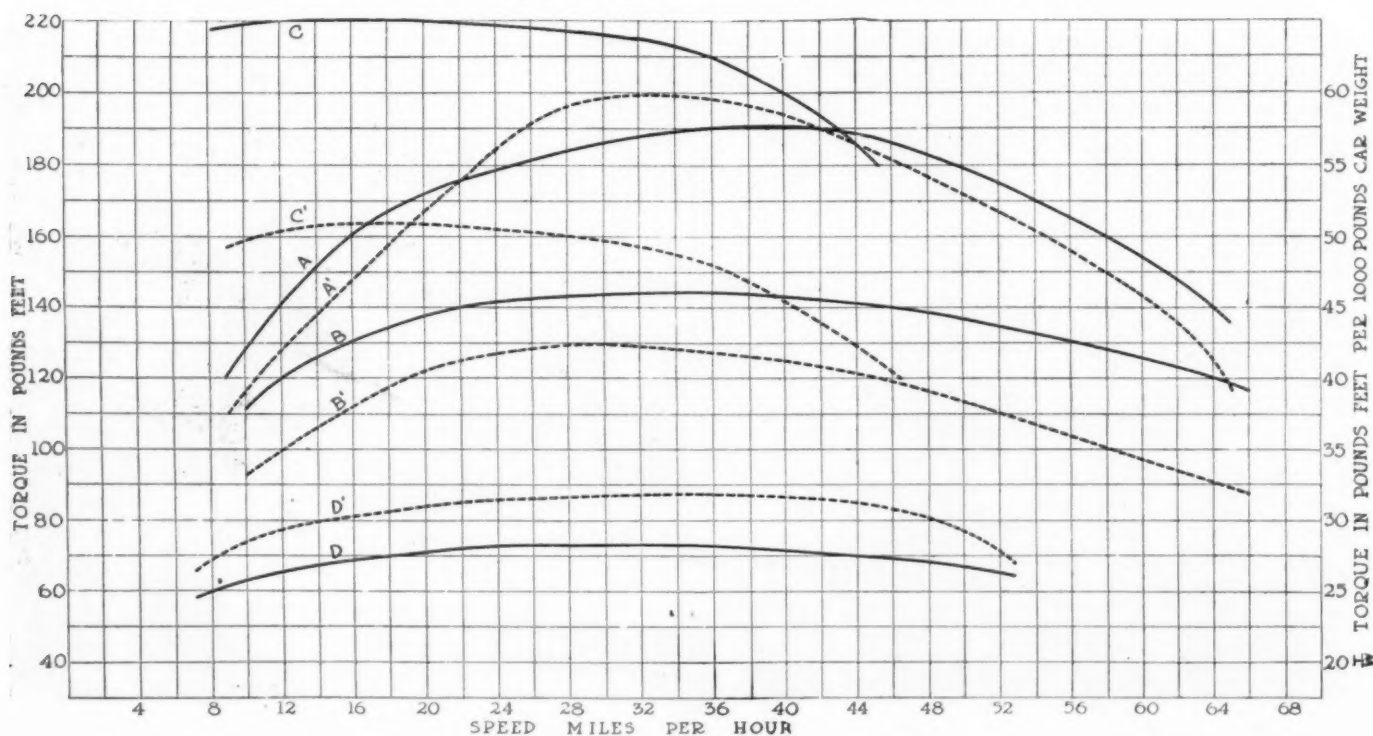
The demand for reserve torque still exists and probably will for years to come. The value of horsepower is something which has been greatly exaggerated by means of the literature of engine and car manufacturers. This idea of high power has naturally taken root with the public, and the average layman has been led to believe that if he has a powerplant capable of a high maximum output under his hood, he has an engine which will enable

him to run away from other cars with a powerplant not capable of developing such high outputs. This confusion even exists in the minds of some of the engineers who are not intimately connected with engine and chassis design departments of automobile engineering.

Curves Show Variation

The curves shown herewith illustrate the wide variation in different types of cars, and also act as an indication of the speed zones in which the engine torque is most effective. There is no doubt that the greatest demand for torque occurs between car speeds of from 14 to 25 m.p.h. During the last 2 or 3 years there has been a very praiseworthy effort to so design the engine that the torque curve rises high and remains flat during this zone. This available engine torque is, of course, a direct measure of the accelerative power and hill climbing ability of the car. It is not entirely complete in itself, however, even at that, as car weight must also be a factor which should be considered.

Curves in Which Solid Lines Show Actual Engine Torque at Definite Car Speeds and Dotted Lines Indicate Torque in Relation to Weight at the Same Speeds



A=Six-cylinder, $3\frac{1}{2} \times 5$, geared 4.46 to 1, 35-in. wheels; weight, 3214 lb.
 B=Eight-cylinder, $2\frac{7}{8} \times 4\frac{3}{4}$, geared 4.05 to 1, 34-in. wheels; weight, 3375 lb.
 C=Twelve-cylinder, 3×5 , geared 4.36 to 1, 35-in. wheels; weight, 4375 lb.
 D=Four-cylinder, $3 \times 4\frac{1}{4}$, geared 4.70 to 1, 30-in. wheels; weight, 2200 lb.

A'=Car A plotted against T/W per m.p.h.
 B'=Car B plotted against T/W per m.p.h.
 C'=Car C plotted against T/W per m.p.h.
 D'=Car D plotted against T/W per m.p.h.

T=Torque in foot-pounds; W=Car weight/1,000; M.P.H.=Miles per hour

To illustrate this point, four typical cars representing up-to-date practice in four, six, eight and twelve-cylinder design were chosen, and the actual torque curves of the engine plotted against a speed of miles per hour of the car. These show the actual torques in pounds-feet at the different car speeds and, of course, take in the factor of gear ratio, which would not be considered were the engine torque plotted alone against revolutions per minute. In other words, these curves represent the effective torque of the engine at the rear wheels, the size of the wheel also being considered as affecting the final reduction between engine and propulsive member.

As a further indication of car performance, these same curves were taken and the weight factor of the car included. The dotted lines illustrate these final curves and are the actual measurements of what can be expected from these four types of cars in definite speed zones.

Zones of Torque Effort

Probably as interesting a comparison as it is possible to make from the curves herewith given is that between the twelve-cylinder engine and the six. It will be noted that in the actual plotting of torque in pounds-feet, the curve *C* of the twelve-cylinder engine is higher than that of curve *A* of the six-cylinder engine for almost its entire length. This would naturally be expected, as the displacements are 424.1 for the twelve-cylinder and 288.6 for the six-cylinder.

Owing to the fact, however, that the weight of the twelve is 4375 lb. and that of the six 3214, and owing to a slight advance in gear ratio, the indicated accelerative ability of the six surpasses that of the twelve at 19 m.p.h. In the zone between 10 and 19 m.p.h., the twelve-cylinder engine is considerably higher. Thus it would be expected that if high gear were used on both cars, the twelve-cylinder car would show a marked advantage in get-away at the lower speeds.

The little four-cylinder engine shown at curve *D* has an exceptionally flat torque curve and represents what might be called typical effort to secure the highest possible torque as early as possible in the range of speeds. It will be noted that the maximum torque of this engine is reached at a car speed of about 30 m.p.h. At this time about 73 lb.-ft. of turning energy are available. It will be noted that more than 80 per cent of this torque is available at a car speed of only 8 m.p.h.

The torque curve of the eight-cylinder engine is another which may be commented upon for its flatness. It is not, however, as flat as that of the twelve or four in the lower ranges of car speed. This shows up particularly on the weight ratios. Naturally a direct comparison cannot be made between these four engines on an output standpoint, because of the difference in displacement. On the other hand, these series of curves tend to show the difference in torque to car-weight ratio, and hence give a direct measure of what may be expected from typical designs in each of the four classes.

It is no doubt a fact that if the public were educated to torque curves instead of horsepower curves, much more intelligent buying would result. When a man says he wants power he means that he wants torque, and to go still further, he particularly desires a high torque to weight ratio. Nine out of ten of the average laymen will look for this quality by having large displacement engines capable of emitting a particularly impressive exhaust when the cut-out is open.

Efficiency and Torque

The connection between the flat torque curve in the early speed ranges and the high-efficiency, high-speed engine has not been brought home. The city driver

appreciates being able to throttle down in traffic and at the same time without a change of gear to accelerate up to his speed limit of 20 m.p.h. This means that the torque curve itself has got to be high within that range and also that the torque-to-weight ratio must be high. The terms of engine efficiency and engine ability are often confused. It is quite possible for an engine of very low efficiency to have a high ability, and the torque curve is no measure of efficiency.

Since the engine torque in relation to car speed has such an important bearing on the performance of the car as it affects the average user, the choice of the gear ratio should take into consideration the question of utilizing engine effort in the critical speed range. At the higher speeds reserve accelerative power is not required to a high extent. The momentum of the car and the inertia of the moving parts make it necessary that only a small amount of turning effort be supplied to keep the car speed constant. On the other hand, it is in this lower range of speeds that the wider variations are taking place, and it is here that the engine torque must be made available to the user. A reduction in car weight, a wise choice of gear ratio and a high volumetric efficiency in the lower part of the revolution per minute scale are the important factors which affect the situation. The factors entering into an increased volumetric efficiency need not be mentioned here, but naturally the question of performance in the lower speed ranges is particularly one of securing a maximum output for every cubic inch of piston displacement.

Turner Drum-Drive Tractor

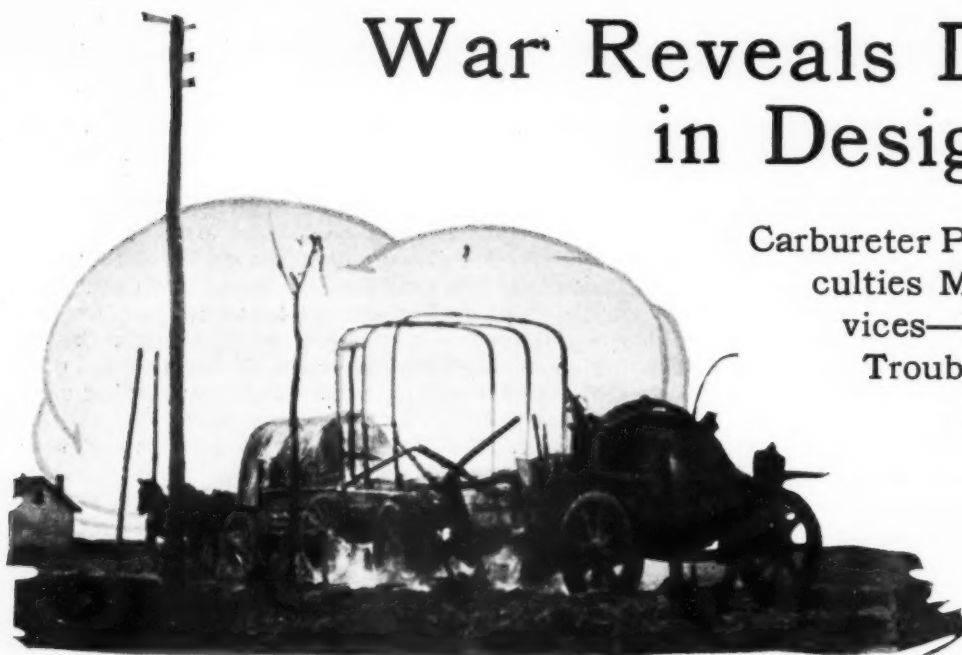


THESE illustrations depict the tractor invented by William Turner, a ranch owner of Washington. This tractor has oscillating driving drums, which enable the tractor to travel over uneven surfaces. The lower picture shows the tractor being driven over a large pole without disturbing the equilibrium of the machine. The upper picture shows the tractor heavily loaded with sacks of grain. A model armored tractor has been tendered to the U. S. Government and is now being investigated. Being constructed with a low center of gravity, the machine may be driven on side hills without danger of turning over.

War Reveals Defects in Design—Part II

Carburetor Problems—Lighting Difficulties Met by Makeshift Devices—U.S.A. Brakes Give Trouble in War Service

By W. F. Bradley



A Kelly-Springfield abandoned and on fire, after being hit by a German shell

ALTHOUGH much is said in military circles about the advantage of carburetors employing alternative fuels, no necessity for this was seen on the front, there always being a plentiful supply of gasoline of fairly good quality. The only complaint that could be made against it was the presence of a certain amount of water in the bottom of the cans. In one case a 12-gal. can, properly sealed, and coming direct from the refinery, was emptied into a tank and found to be pure water. In all cases one could be reasonably sure of finding a quarter to half a pint of water in half the cans opened. This naturally suggests a tank which can very easily be dismantled, whether it be built in the body or under pressure at the rear. In the case of the accident mentioned above it was impossible to get the tank out without pulling the body to pieces; consequently, the car was off the road two days, during which time the driver was washing out the tank with fresh supplies of gasoline. An Italian car had somewhat similar trouble at the same time, but as the body had been correctly designed, and the filler made big enough to allow the passage of a man's hand, everything was dismantled, dried, and replaced within an hour.

Troubles with U. S. A. Carburetors

The trouble with American carburetors was their liability to get out of adjustment. On the other hand, they were very easy to adjust by any driver who would take the trouble to study them. They also had the advantage of giving much easier starting from cold than the majority of the European carburetors. On one American type the adjustable main jet in the base of the carburetor was liable to work loose, allowing an excessive amount of gasoline to pass through. Being below the level of the sub-frame, it was not a very easy matter to tighten up the lock nut; thus the mixture would gradually become richer, causing excessive consumption, until finally real trouble would develop. Frequently the driver did not notice that his mixture was becoming richer until it had reached such a point that he could no longer run.

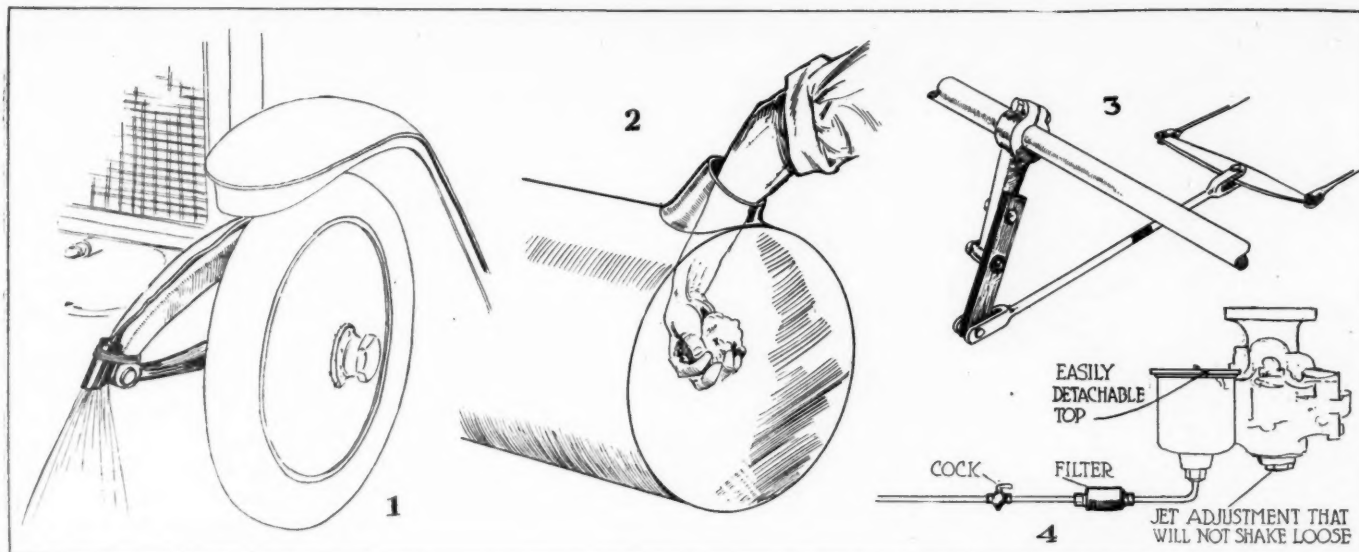
Because of this tendency to get out of adjustment, European military motor authorities have manifested

their dislike toward several makes of American carburetors, and in placing some recent important contracts have insisted on the adoption

of a European carburetor, which, once set, cannot be adjusted except by the changing of the jets, and the driver is not allowed to have spare jets. On the great majority of Italian vehicles the whole of the air is drawn from the valve-stem chamber, and the carburetor being bolted direct into the cylinder casting or with a very short intake pipe, vigorous heating is secured. No cases came to light in which the heat was too great under the hood, although in some of their colonial campaigns this difficulty had been met with, and overcome by putting the carburetor right outside the hood, usually to the rear of the dash.

Among some of the minor features which often assume considerable importance on active service may be mentioned an easily dismantlable float chamber cover. On all the American motors a screwdriver has to be used to take the cover off; on some of the Fiats the cover screws down, but it is so near the cylinder casting that there is insufficient clearance to pull it out. Thus the entire carburetor has to be taken down by unscrewing three nuts inaccessible except with a special wrench. The Claudel is ideal in this respect, for the cover is held by spring-controlled balls, and can be taken off, removing the float and needle in a second without the use of any tool. There should be an accessible and easily dismantlable filter on the gasoline line, near the carburetor. A cock just behind the filter is an advantage, for it allows the flow to be shut off with a minimum of labor. These remarks apply particularly to cars on winter service, for a common way of keeping the water from freezing is to cover the radiator and hood, shut off the gasoline, and empty the float chamber, then place a small kerosene lamp under the hood. Kerosene is generally easily obtainable, and the system is very efficient, easy of application, and presents no danger provided these requirements have been incorporated.

EDITOR'S NOTE—In this article Mr. Bradley, special correspondent of *THE AUTO-MOBILE* with the allied armies, outlines in detail the chief troubles and defects brought out by war in the design of cars and trucks in the Italian service. During his work of several months as an ambulance driver, Mr. Bradley was in daily contact with army vehicles and the men handling them, so his knowledge of the subject is at once accurate and comprehensive.



1—Special lamp made from shaving soap tube and mounted on spring horns to throw light in front of wheels for work close to the firing line. 2—Large filler openings are needed for gasoline tanks in war work so that the interior is easily cleaned. 3—Brake adjustments frequently proved inadequate on the Italian front and this means was used to increase the leverage. 4—Points in carburetor layout essential to satisfactory operation under war conditions

Lighting sets on automobiles working at the front present some difficulties and peculiarities. An independent electric lighting dynamo, with head, side, tail and inspection lamps, was very satisfactory provided the set had been built in with the chassis and not put on as an afterthought. In this latter case the work was rarely done satisfactorily; either the dynamo was exposed to dirt, or the belt could not be tensioned, or the whole was inaccessible, or the wiring was not properly encased and free from friction. Given these disadvantages and a mediocre driver, and trouble was bound to develop. It is probably on this account that the English authorities insist on two sets—electricity and oil. Unfortunately, there are comparatively few European cars with a correctly designed and properly fitted lighting set. Most of them are additions. Further, for truck work it seems unnecessary expense to fit a dynamo and electric lamps. The Italians use a self-contained acetylene generator and headlight, nearly always mounted on the dash, and also side lamps. The dash position has many advantages, for it enables the driver or mechanic to attend to the light without leaving his seat, also to screen the light as he passes into sections of the country where lights could be seen by the enemy. There is the additional advantage that the lamp is always protected against the minor collisions that are so common when driving has to be done during the night.

Delco lighting sets on Buicks proved very satisfactory. The writer can speak from personal knowledge of half a dozen cars which since August, 1916, to the present date have been behind the trenches and ahead of the artillery and never under cover, even for repairs. Most of the drivers had very little mechanical knowledge, and it was known that some had run their cars for 12 months without oiling or giving any attention to the generator. Yet no trouble developed on these cars.

The cars with which the writer was connected were working so near the front that

for the first and last 5 or 6 miles of every out and home trip no lights whatsoever could be shown. Farther away a dim light could be shown, then one headlight with half the area of the glass blackened out. Oil side lamps were carried, but never used or kept in condition to be used. Tail lights were found useless, and never employed except on a few staff cars. There is absolutely no need for a tail lamp on war service.

Lamp Made from Shaving Soap Tube

Many drivers rigged up a special lamp for work close to the trenches or on roads in view of the enemy. A shaving-soap tube was obtained, and its bottom cut so that it opened at an angle of about 45 deg. The small inspection lamp was secured inside this, the cable being brought over or through the dash and alongside the hood, and this improvised lamp fastened by adhesive tape to the extreme end of the left-hand spring horn. This threw a ray of light on the ground just ahead of the left-hand wheel, but no light went upward. Although regulations were that no light of any kind should be shown in the zone of operations, the military police would pass this improvised lamp until the car had got within three miles of the front line trenches. Taking half a mile from the trenches as the farthest possible point forward, this meant that only 2½ miles had to be driven in complete



A disabled car being hauled out of range by a French truck



Staff car outside a wrecked house in Gorizia

darkness. Drivers would often make trips with this spring horn lamp which other men not provided with the fitment would declare impossible, or would only accomplish by having a man walk 2 ft. ahead of the radiator. The spring horn lamp was kept permanently in position and a hand torch used for general purposes around the car.

U. S. A. Brakes Give Trouble in War Work

A vigorous protest must be lodged against the American practice of fitting internal and external brakes on the rear wheels. Perhaps under peace conditions, when every car is brought into a garage each evening and is washed every morning, the feature may be passable. But under war conditions, when cars are either on the road or standing in an open yard, a field, a garden, or a public square, and cannot possibly be washed the full measure of the disadvantages of external brakes is revealed. On an external brake there are ten moving parts, adjusting nuts, screws, etc.—twenty for the pair of brakes—and every one of these parts is working in a constantly renewed bath of mud which the driver has no time or opportunities to remove. In counting up these parts the brake cam shafts have not been included, for the bearings have a slight amount of protection against mud. On a properly designed internal brake the only exposed part is a yoke pin, and even this could be protected by a boot if it was worth while. The consequence is that all these parts, some of which move every time the brake is applied and others only move for adjustment, become solidly rusted until brakes stick and adjustment is impossible. The remedy is for the driver to hack away the solidified mud, crawl under the car and wash every pin with kerosene. The cleaning ought to be done at regular intervals, but it requires more than ordinary human enthusiasm to crawl in the mud under a car so long as the part will give reasonable service.

On paper and in the showroom it looks the correct thing to place the brake adjustment at the rear end of

the control rods, just above the axle. In this position they enjoy a constant mud bath, and when adjustment is required it is found that the threads are so rusted and mud choked that it is impossible to move the nuts or turnbuckles until the parts have been carefully cleaned with kerosene. The correct place for adjustment is at the front end, right under the floorboard, where no mud can enter and the slight splashing of oil and grease prevents the parts rusting. The adjustment provided on very many cars is inadequate to take up all the wear on the shoes. In some cases this was overcome by riveting an extension to the first lever just ahead of the balancing beam.

Brake Area Too Small

As a rule, brakes on all cars err by reason of too small an area. The most strenuous conditions are convoy work on crowded mountain roads, and the maker has rarely taken such conditions into consideration. There is an unexpected amount of brake work, too, on isolated vehicles having to pass slower vehicles and convoys on crowded roads leading to the front. This entails a succession of periods of quick acceleration and hard braking unknown elsewhere. In city traffic this may have to be indulged in for a few minutes; on some portions of the front cars are driven constantly under these conditions. On some Fiats, doing fast service on crowded hill roads it has been necessary to renew all the brake linings once every three months; yet these cars have a very liberal brake area. Some officers in command of American ambulances state that the original brake linings had to be removed after 2000 miles running. The writer only had experience with Ferodo linings on these cars, and they certainly lasted four times this distance. Reports were received from some quarters that brake rods were continually breaking, and that welding was useless as a repair, for the metal would crack each side of the weld. This defect was solved by fitting new rods of Brt. M.S. $\frac{3}{8}$ -in. diameter. The writer never personally came across an instance of a brake-rod failure.

A few cases have come to light of brakes being too powerful for the transmission, and one maker at least has found it necessary, as the result of war experience, to reduce the size of his transmission brake. With the brake drum unsupported at one end, there obviously is a limit to the size which can be adopted without transmission troubles developing. A few makers have discovered the necessity of having a bearing both in front and back of the brake drum, but the disadvantages of this are a more complicated design and greater difficulty is dismantling the brake shoes whenever relining becomes necessary.

All-metal wheels have proved their worth in a remarkable manner on the Italian front. Trucks of $3\frac{1}{2}$, $2\frac{1}{2}$ -ton capacity, as well as the big tractors, are all fitted with cast steel wheels. The $1\frac{1}{2}$ -ton chassis, used either as fast trucks or ambulances, also all the fast armored cars and a number of the lighter 1-ton chassis, are fitted with detachable steel disk wheels, naturally with pneumatic tires. Wood wheels are only to be found on some of the older trucks in service long before war was declared, on a percentage of the staff cars, on the American ambulances, and on some of the older Italian and French cars converted to ambulances.

All-Metal Wheels Used

There is no doubt the Italian authorities have been led to the use of all-metal wheels by reason of the trouble developed with wood working under very varied climatic conditions. With the rare exception of cracked

spokes, occasionally seen on a truck having been in service for a long time and subjected to rough usage, no cases of breakage or failure were met or heard of. One truck, in hard service right at the front since the beginning of the war, was observed with five out of seven of its front wheel spokes cracked. The driver reported that this seemed to make no difference to the running of the truck, and that he would continue running until an opportunity came to go into the workshop for a general overhaul, which, incidentally, was very badly needed. Such cases, however, were very rare.

Steel Disk Wheels for Rough Service

The steel disk wheels proved absolutely ideal for rough service at the front. They were used on heavy armored cars capable of 50 m.p.h., they were dropped at speed into shell holes; they went over 6-ft. embankments; they figured in collisions, and they occasionally dropped off bridges into the river, but the writer fails to recall a single instance of a wheel breaking, or of a vehicle unable to get home by reason of the condition of its wheels. Bursting shrapnel which would certainly have cut the spokes of a wood wheel, and probably caused it to collapse, had very little effect on the steel disk. In the matter of ease of cleaning there is no comparison between the two types. There were no opportunities of getting comparative weights of wood and steel disk wheels, but merely from handling the two it is imagined the steel disks are slightly heavier. This, however, is of no importance on a 1-ton truck.

Size of Wheel Employed

The size of wheel most commonly employed in Italian service is 880 by 120 (34.6 by 4.7 in.), single wheels being fitted at front and twins at the rear. On all the 1½-ton chassis the front wheels were secured by five studs and nuts of about 18 mm. diameter. At the rear



On the road to Gorizia—wrecked houses used to quarter troops

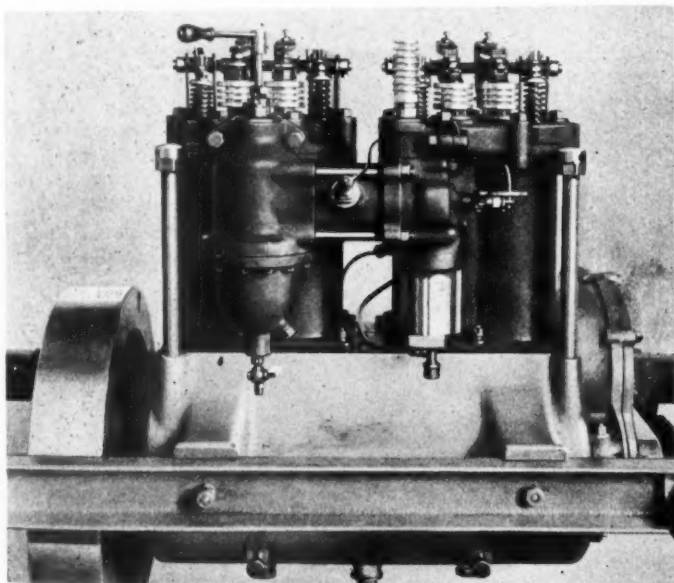
there were ten such bolts. All the wheels were drilled with ten holes, but five of them were not used on the front. Some of the armored cars, with 135 mm. section tires, and a very much higher speed than the 1½-ton trucks and ambulances were capable of, had only six bolts, and according to the drivers these were quite sufficient. It appears that these wheels had originally been designed for five bolts back and front, but as in some cases the drivers had neglected to screw up tight, the number had been doubled. The writer handled a 1-ton Fiat, carrying a 50 per cent overload, with only the five bolts front and rear and never experienced the least trouble.

(To be continued)

Kraus Oil Engine Generates Steam

Perfect Combustion by Use of Large Proportion of Air

WHAT appears to be an entirely new type of internal combustion engine is being demonstrated by the Kraus Auto Oil Motor Corp., 25 Church Street, New York. In brief, this is partly a steam engine without any boiler. In the illus-



Kraus steam engine which has no boiler

tration shown, the right-hand cylinder block which contains two bores is an air compressor. The left-hand pair of cylinders are the working cylinders. The box, or chamber, connecting the two, in the middle of which a spark plug can be seen, is both the boiler and the fire box. A continuous spray of fuel oil under pressure is fed to this chamber where it is ignited originally by the spark plug. Once burning, the current can be switched off and the flame will be maintained. The compressed air from the right portion of the engine is fed continually to maintain the combustion, and water is also supplied, being instantly converted into steam. The mixture of steam and exhaust gas from the combustion passes into the power end of the engine, which can be controlled by throttle, cut-off or in combination of the two.

Special Claims

The following special claims are made for this design:

As is demonstrated by the motor which has been built, there should be no necessity for water cooling. The air compressor does not seem to run hot, and of course the working cylinders would require to be lagged rather than cooled artificially.

Starting direct on fuel oil, without the presence of any gasoline, seems to be easily accomplished.

Perfect combustion is claimed to be attained by using a large proportion of air. Owing to the considerable saving in the cost of fuel, this engine should be particularly attractive to makers of commercial vehicles and tractors.

The company intends to issue manufacturing and selling licenses.

United Tractor Uses Fifth Wheel

6-Ton Road Tractor Unit Will Be Produced on Large Scale—Price \$2,490

THE United Motors Co., Grand Rapids, Mich., is embarking on the manufacture of a 6-ton road tractor unit on a large scale. In order to carry out the schedule of 200 tractors per month a 60 by 400 ft. addition is being built and this will be used exclusively for their assembly.

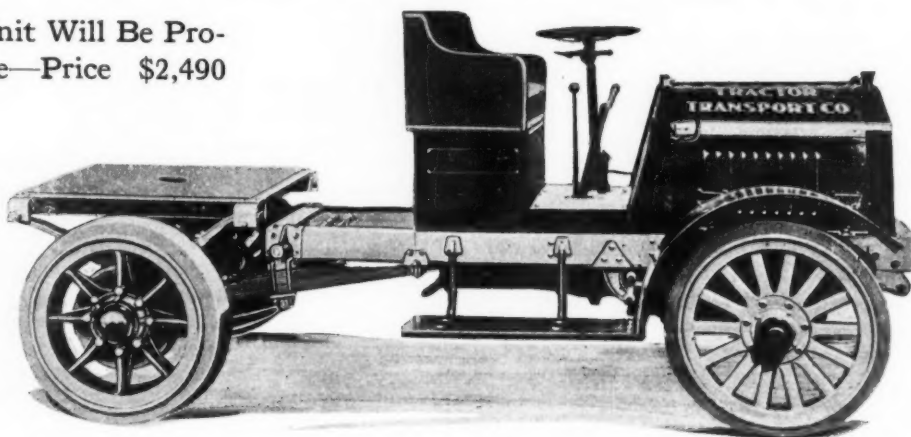
A wide variety of purposes are filled by the new tractor which will sell for \$2,490. Practically any type of hauling can be economically taken care of because of the ease of trailer connection. The company is licensed by the Knox Motors Co. to manufacture the spring suspension under the Martin patent number 1,018,248. The tractor has a spring supported rocking trailer platform which carries 40 per cent of the pay load under normal circumstances. The balance of the pay load is carried by the rear axle of the trailer.

By this arrangement the cantilever springs upon which the trailer unit itself is suspended are relieved of all pay load weight. On the under side of the springs where the cantilevers are anchored to the frame, are brackets to which are fastened by substantial pins the radius arms which extend to the rear and are bolted to the under side of the trailer platform spring seats. These in turn are fastened to a solid or dead axle.

Wheel Built of Angle Iron

The trailer platform or rocking fifth wheel is built of a substantial angle iron frame heavily reinforced and covered with boiler plate on its upper surface. This construction allows of the use of any diameter circle on the upper carrier and hence will permit owners of horse-drawn vehicles to readily motorize them by means of the tractor. The holes for the king pin is in the center of the plate, and beneath the plate there are provisions to take the thrust of the pin and to insert the locking device to prevent the withdrawal of the pin while the tractor is in use.

The rear axle is a Torbensen internal gear type built up of a solid or dead axle carrying, on roller bearings at its outer



United Motors Co. 6-ton road tractor unit, showing rocking fifth wheel manufactured under Martin patent

ends, a pair of 34 by 7 in. steel wheels fitted with solid rubber tires. Bolted to these wheels are the brake drums and the internal driving gears. At the rear of the dead axle is the housing carrying the differential gear with its bevel drive gear and pinion.

The engine is a Buda 4¼ by 5½ L-head, block four with a three-bearing crankshaft, splash-pressure oiling system and pump cooling. It is provided with a four-speed gearbox with nickel steel gears and splined shafts mounted on ball bearings. The drive is taken through a carbon steel propeller shaft of seamless tube through two universal joints to the Torbensen rear axle. The reduction in the internal gear is 9 to 1. The seat and dash are steel, cushioned and padded. Ignition is by Bosch magneto and the tires are solid rubber front and rear, the front being 34 by 3½ and the rear 34 by 7.

58 Cars in Hankow

At the close of 1916 automobiles numbering fifty-eight were registered in Hankow, China. All the cars in use in this city are exclusively for traffic within the concessions. This is an increase of fourteen over 1915. Of the cars registered, thirty-five were American, eleven French, nine British, and three German makes. The customs reports for 1916 show a valuation of \$15,303 in automobiles, and a total importation of twenty.



United Motors Co. 6-ton road tractor unit as it appears when pulling a truck body carrying a heavy load



The F O R V M



Throttling Superheats Steam

By Earle A. Ryder

YOUR article on the Stanley Steam Car is very interesting and should help to awaken interest in the claims of the steam car.

I noticed a slight inaccuracy, however, in your reference to the throttle as causing a tendency to condensation. On the contrary, throttling causes superheating, and this fact is the basis of operation of the "throttling calorimeter" for finding the percentage of moisture in steam.

The heat in 1 lb. of dry saturated steam at 600 lb. per sq. in. is 1210 B.t.u. A pound of dry saturated steam at 200 lb. pressure holds 1198 B.t.u. If we have a boiler pressure of 600 lb., reduced to 200 lb. by throttling, there is thus an excess of 12 B.t.u. per lb. of steam which goes to superheating the steam (assuming dry steam to start with). This will cause a superheat of about 18 deg. This effect is more pronounced as the terminal pressure becomes lower.

Stanley Company's Statement

With respect to this letter the Stanley Motor Carriage Co. writes as follows:

The feature of the system of superheating which we use is passing the steam through the throttle; then through a tube of the boiler; then through a tube exposed to the heat of the fire; then up through a tube in the boiler again. This gives a comparatively uniform temperature to the steam under the varying road conditions, wherein the throttle may be slightly opened, halfway opened, or fully opened. Because when the throttle is slightly opened the pressure after passing the throttle would be low, and while the temperature of steam at 600 lb. is about 490 deg., at 200 it is only 381 deg.; therefore the steam might be given 100 deg. to superheat even if there was no fire burning.

If the fire were burning and the steam consequently was heated to a very high temperature it would give up some of its heat to the boiler in passing up through it the last time.

Hydraulic Transmission

By Charles R. Pratt
Consulting Engineer

IN a paper recently reprinted in THE AUTOMOBILE by F. Leigh Martineau, the efficiency and adaptability of hydraulic transmission for commercial vehicles or passenger cars are clearly established. The success of the Hele-Shaw Martineau steering gear on British battleships and merchant marine has caused the United States navy to adopt it for a standard for all their large ships, but with the additional efficiency of the Pratt control, which can give it ten times the average rudder speed with no increase in the horse power of the motor which drives the variable stroke pump.

The Pratt control varies the leverage (gear) between the motor (gas engine) and the load (driving wheels) in exact proportion to the load. It does this by automatically varying the stroke of the pump by the pressure delivered by the pump, with the following results:

A—Start the engine.

B—Throw the control lever to full speed.

C—The variable stroke pump is moved off zero stroke to start car.

D—The inertia of the car causes the hydraulic pressure to rise instantly.

E—This high pressure delivered by the pump acts against a yielding connection between the control lever and the pump, thereby limiting the increase of pump stroke to the pressure delivered by the pump.

F—As the inertia is overcome the hydraulic pressure falls until the pump has its full stroke and the car its full speed.

G—The torque on the driving wheels is limited to their maximum traction grip on the road and they have exerted their maximum draw-bar pull without skidding; to skid is to lose time and wear out tires.

H—The torque on the gas engine has been limited to its maximum torque at its most efficient speed, hence the engine has delivered its maximum horse power and cannot be slowed down or stalled.

I—The car has attained its full speed in the least possible time and distance and with an acceleration so perfect that a passenger with his eyes shut would not know the car had started.

Running

A—Let the control lever remain at full speed.

B—As increase in grade or roughness of road increases the torque load on the driving wheels, the hydraulic pressure rises and the pump stroke (gear) is automatically and instantly shortened in exact proportion to the increase of drawbar pull required, whereby the torque on the engine is not increased and its speed is not reduced.

C—Should the driving wheels become locked in a deep hole or any other obstruction prevent the forward motion of the car, the increase of hydraulic pressure reduces the pump stroke to practically zero, the speed of the engine is not reduced, and it continues to run at its most efficient speed.

D—The total trip has been covered at the highest possible average speed with the engine always running at its maximum efficiency and using the least possible amount of gas.

E—If the engine has an efficient speed governor to regulate the gas, the driver has nothing to do but steer and regulate his speed for traffic by the control lever.

F—Without this automatic change of gear the engine must have sufficient power to avoid frequent change of gear even by an expert driver and to avoid stalling the engine by a stupid or lazy driver, and this is estimated at twice the power that is required for this automatic control transmission.

G—This automatic control reduces the size of the engine and the amount of gas used to about one-half of that required without it.

For reversing, slam the control lever from full speed ahead to full speed back and the car reverses in the least possible time and distance without skidding the driving wheels or slowing down the engine. For coasting, either by driving the engine through the hydraulic transmission or by stopping the engine and by-passing the fluid, the speed is controlled from full speed to stop without heating or wearing of any part. (No brake used).

Brake Only for Emergencies

Bring the control lever to stop and the pump automatically returns to zero stroke, stopping the car in the shortest possible distance without skidding the wheels. A brake is only required to hold the car from creeping slowly under oil leakage when stopping on a steep hill.

The Owen Magnetic has found popularity by a slight automatic change of gear and a smooth start, but it still requires the usual reverse gear. A three ton truck driven by a Pratt hydraulic transmission (somewhat similar to the Janney transmission described by Mr. Martineau) and a Pratt control, recently added, has successfully performed severe service here for several years. Before this automatic control was applied, the hydraulic pressure to start the car would jump to 2000 lb. per sq. in., but with the Pratt control the car gets up to full speed in less time and with less than 250 lb. pressure.

Until this control was applied, it was easier to stall the engine than by any clutch and gear transmission, but with it the engine cannot be stalled by any load conditions.

Mr. Martineau has shown that for direct efficiency, reliability, size, weight and cost, hydraulic transmission is equal or slightly superior to any other transmission, but to automatically and instantly vary the gear so as to limit the torque on the driving wheels and on the engine shaft, makes hydraulic transmission a necessity for automobile efficiency, economy and ease of control.

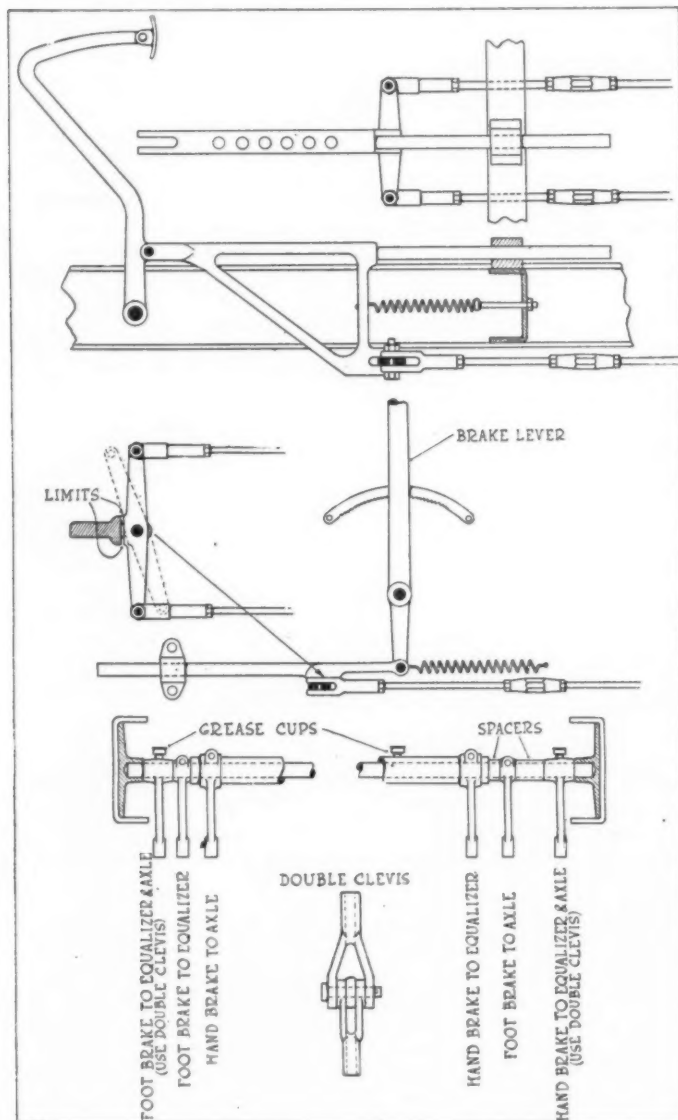
Better Brake Equalizers

By W. B. E.

HEREWITH is a suggestion for brake equalizers following my reading of the article on the subject in *THE AUTOMOBILE* for April 12.

I built an automobile and experienced the difficulties mentioned in your article and so decided to go into the matter thoroughly to see if they could not be avoided. The result was as follows:

First, the equalizing bar must have a limited travel to take care of rod breakage so that one brake in a set would be effective; second, the clevis for the equalizing rod or beam must be of substantial construction and not merely a small standard rod end. This precludes the possibility of breaking the main rod should the equalizing beam come against the limit stop; third, the equalizing beam must be long so that the total moment caused by friction at the cen-



Improvements in layout of brake linkage suggested by W. B. E. Some of the features embodied in this are provision for safety in event of rod breakage, strong equalizing beam and turnbuckles close to equalizing beam and each other

ter pin would be a very small quantity as compared with the much larger moment tending to equalize the brakes; fourth, the adjusting turn buckles on the two brake rods should be close to the equalizing beam and close to each other, so that the effect of tightening them may be observed and the equalizing beam kept perpendicular to the line of action of the rods.

I found that the devices in the inclosed sketches did the work in a very much better manner than any equalizing device with which I had come in contact. What I mean by a limit stop is this: The main clevis should not be milled out so that the equalizing beam has undue action. I used solid forgings, cutting them out to procure lightness and at the same time strength. Such an arrangement, however, is not foolproof and requires ordinary intelligence in keeping the equalizing bar across the line of action of the main rod when taking up the turnbuckles. The driver, however, can make effective one hand-brake and one foot-brake in case the axle should slip on the spring or one of the brake rods break, which would be impossible with any equalizing device I have seen.

Personally, I do not see where any argument could exist concerning the desirability of equalizers. The wear on tires due to poor brake adjustment is just as much a waste as a gasoline line leak, and how many people driving cars, or slipshod garage mechanics, know how to, or can, adjust two brakes so that their retarding action will be the same when the pedal is pushed or the lever pulled? Equalizers cost something to the car builder over straight rods, but again the car user soon saves the difference in longer tire wear.

Stages in Piston Design

By J. Leopold

IN *THE AUTOMOBILE* for March 29, Ferdinand Jehle passes comment on my article "Stages in Alloy Piston Design," which appeared in a recent issue. I believe that if Mr. Jehle will peruse the article again he will see that I do not make a statement that "it is not possible in the permanent mold process to use a scraper ring without making a piston with very thick walls unless the piston be relieved on the outside." But quite contrary to this, he will find that I stated: "at this stage of die casting manufacture it was impossible to place a ring on the skirt, etc." It is obvious that I was reverting to a prior stage or period rather than to the present time, if consideration is permitted the remaining portions of the article.

As a matter of fact, I was well aware of the latest development in the permanent mold process some little time before the article in question appeared and therefore purposely made it manifest that I was reviewing merely *past* stages.

I am of the opinion that Mr. Jehle will not hesitate to agree that I was entirely correct in my previous statement that it was obligatory to take recourse to the former mentioned method of side wall relief to provide for an economical section in the die cast piston when a skirt ring was used at the period when the deep recessed type received its most general application.

Philippine Imports Gain 50%

THE Bureau of Insular Affairs of the War Department, which has jurisdiction over customs matters for the Island dependencies of the United States, in a statement on the import trade for 1916 of the Philippine Islands states that, despite a depression generally due to the war, the automobile trade showed marked development. Continuing, the report says:

"There was a 50 per cent increase in the number imported, and though the war was characterized by the usual condition of declining average price, due to cheapening production and the increase in lower grade machines, the aggregate value of automobiles was materially larger than that of 1915, and there was also a marked increase in parts and equipment.

"Manila as an oriental distributing point for the American automobile trade is indicated in exports of some importance of American machines to nearby countries."

Must Start War Right

Our Two Great Problems Are Co-ordination of Effort and Bringing the American People To Realize What This War Means,

Director of London "Daily Mail" Tells Merchants'

Assn.—Censorship Costly to Entente

AMERICA must start its war against Germany right, and as if this war were to be waged without assistance or co-operation from any quarter. This is the only safe basis on which the United States can proceed, Pomeroy Burton, manager and a director of the London *Daily Mail*, told the members' council of the Merchants' Assn. at a meeting held at the Hotel Astor recently. The American people must be made to understand that this war is likely to tax the resources and the entire fighting strength of the country to the full. So many of our people feel that the war is not a part of their daily lives that the general effect of this sentiment is to impair our co-operation with our allies and to endanger the great cause for which all are fighting. The theory that the war will be short has been Germany's strongest ally, according to Mr. Burton. But for this theory the war might now be nearing its end, or perhaps over, instead of at a stage concerning which one of the foremost men in Great Britain stated recently that the end is invisible. Our people must recognize the fact that before this war is over we may have to put into the firing line, and maintain there, an army of not less than 500,000 men. Up-to-date military experts believe that the war's worst and most dangerous stages are still to come, and we must prepare to meet these conditions.

Mr. Burton urged that the United States refrain from imposing a close censorship such as that which has cost the allied nations dear. He advocated an open censorship coupled with a campaign to educate people as to the serious character of the war as the most satisfactory method of placing the war plans of the United States on a grand scale. To give an idea of the magnitude of the changes the war produces Mr. Burton cited England's original army of 150,000 men as compared with her present army of 5,000,000 and her original navy of 150,000 as compared with the present force of over 500,000.

Describing the natural consequences of removing 40,000,000 men from productive occupations for military purposes, Mr. Burton dwelt on the world-wide food shortage and told how English fleets are taxed to the utmost to provide supplies for the Allies. In closing his talk he urged the education of the people in the United States as to the cause of the war, the story of Belgium, the sinking of the *Lusitania*, *Arabic* and *Sussex*, the sinking of Red Cross hospital ships, and the story of the German machinations in this country since the war began. These should suffice to awaken our country to a sense of the serious situation with which we are confronted. Mr. Burton's talk follows:

"The two great needs which confront this country at this moment are:

"First, co-ordination of effort at Washington through a War Council fully empowered to deal with all war problems, in consultation, of course, with cabinet members, legislators, experts and others, and

"Second, and equally important, an extensive and systematic campaign of information conducted through the advertising and news columns of every useful publication in the United States, designed to make the people understand this war.

"They are far from understanding it now.

"Five weeks of careful inquiry convince me that the great majority of people in this country believe the war to be nearing an end.

"They look upon the entry of the United States as a part of the stage-setting for the last act of the great war-drama.

"It is the Short War fallacy in a new guise.

"But for this same Short War fallacy, the war *might* now be nearing the end—indeed, it might be over.

"The people of every nation now engaged began with the firm conviction that they were in for a short war.

"That fatal theory has entered largely into the war preparations of every country involved. It has shaped war policies. It has warped and misguided public sentiment. It has cost countless thousands of human lives. It has prolonged the war. It has been Germany's strongest ally.

"The best informed military experts believe to-day that the war is *not* nearly over. They believe its worst and most dangerous stages are still to come.

"One of the foremost men in Great Britain has stated publicly within the past week that the war's end is invisible.

"Barring possible collapse through hunger, Germany can go on for years.

"Barring possible failure to meet and overcome the submarine campaign, the Allies can go on for years.

"Neither of these contingencies should be considered for one moment in shaping the war program of this country.

"Neither one is likely to happen.

"The only safe basis for this country to proceed upon is to assume that *the United States alone* is entering upon a war with Germany—a war which will tax its full resources and its entire fighting strength.

"The people would not fail to understand the seriousness of that situation.

"They would respond as one man to the call of country, for they would at once realize their own and their country's peril.

"There would be an outburst of patriotism and a rush to the flag such as this world has never seen.

"The people's hearts, souls and bodies would be offered in one grand acclaim to the country's cause—the cause of freedom and human liberty.

"There would be no politics, no divided councils, no false starts, no small handling of great problems, with a great and powerful enemy at the gates.

U. S. War Needs

- 1—Co-ordination of Effort
- 2—Campaign to Make Public Understand the War
- 3—Realization That It Is Our War
- 4—People's Hearts in the Fight
- 5—Open Censorship Policy
- 6—Large Scale Preparation

"No, there would be one grand, overwhelming wave of patriotism and desire to serve which would enlist automatically every ounce of energy and war spirit in the land against the common enemy.

"The hearts of the people would be in the fight. They would understand what threatened them, and would rouse to their task.

"To bring it home still more clearly, imagine for a moment the removal of the mighty fleet which has stood as a protecting shield between this country and Germany since the day the war began.

"Would not that bring a quick and a full realization of the part the people would be called upon to play in the quick mobilization of the country's whole war forces?

"Well, that is the only correct view to take of this country's responsibilities to-day. And to reach that view quickly the people must be made to understand the war as they do not, I fear, understand it now.

"For instance, they utterly fail to realize that before this war is over, this country may have to put into the firing line, and maintain there, not less than 500,000 fighting men.

"No democracy was ever effective in war without the full understanding and backing of the masses—of the working people.

"Legislation alone will not make this or any other country an effective war factor.

Must Feel Ourselves Part of the War

"This country is a long way from the battlefields of Europe, and there is no doubt that great masses of its people feel themselves apart from the conflict, not a part of it.

"They feel that it is Europe's war, and they do not understand why this country should mix up in it. They utterly fail to realize that the things involved are their own personal freedom, their own material interests, their own and their children's futures—all of which are as much at stake here to-day as they are to the people of England, and of France.

"It must be admitted that the main reason for the utter inability of the people of this country to grasp the true significance of the war to-day is the policy of suppression which has prevailed in the principal entente countries since the day the first shot was fired.

"This close censorship policy has cost them dearly.

"It has kept the spirit and meaning of the war from entering the minds of the people in this and other countries remote from the conflict.

"It has been a brake pressed hard on the wheels, while the hauling was all uphill.

"I trust that the Washington authorities will begin right, and take the people into their full confidence. That in itself will be a mighty step forward.

"Couple an open censorship policy with an energetic publicity campaign designed to bring home to the people the full significance of the present war situation, and this country will soon be shaping its war plans on the grand scale.

"Now, the grand scale deals with no small figures.

"Its units are of colossal size.

"Its requirements are measured only by the country's uttermost resources of money, of materials, of men. It means the best brains, the best brawn and muscle, the best plans and the best team work that this country is capable of producing.

England's War Experiences

"Perhaps a glance at what has taken place in England during the past 2 years will serve to make that point clear.

"England's original army consisted of 150,000 men. England's present army is 5,000,000.

"The British army at present in France is 2,000,000 strong. The remaining soldiers are divided into the armies of Salonica, Mesopotamia, Egypt, German East Africa and India. In addition to the 5,000,000 men in arms, England has more than 3,000,000 men engaged in war industries.

"She also has a reserve of another million men of military age in various stages of readiness, on call, or in active training, to be utilized for military purposes, if emergency requires. However, she can ill spare any more men from the land, from the collieries or from the factories, and there is

some urgency in the direction of transferring more men to the lands, owing to the world-wide food shortage.

"This food shortage is the natural result of putting something like 40,000,000 men into active military service, taking them in large measure from ordinary productive occupations in all the disturbed parts of Europe.

"Nothing could more strikingly illustrate the essential nature of the people's co-operation than the development of England's great Ministry of Munitions. There are now nearly 100 government plants which have been specially built to cope with war requirements. Working directly under the Ministry of Munitions are 2,500,000 men and over 1,000,000 women. Women are engaged in more than 500 munition processes. The production of guns and munitions has multiplied sixfold during the past year.

"The British have moved back and forth across the Channel over 8,000,000 men, over 10,000,000 tons of explosives, over 50,000,000 gallons of gasoline, and over 1,000,000 sick and wounded, and all this without any losses due to enemy attacks.

"England's original navy was 150,000. Her present navy exceeds half a million. In addition to the direct naval requirements, England is obliged now to supply all her troops, all her armies in distant parts, with their equipment for war and necessities of life, and in addition she is also obliged to keep huge fleets constantly busy with the transportation of coal and other essential commodities to her allies, notably France and Italy. This means an enormous sea force, in addition to the regular naval force, and the organization and control of this auxiliary navy is one of the great achievements of the war.

"That will suffice to indicate what I mean by the grand scale of preparation.

"No such scale, and consequently no really adequate co-operation with the Allies in this war, is possible without the full and earnest co-operation of the whole people of the United States.

"That co-operation cannot be secured until they know the facts and feel the full force of their responsibility.

Need Public Education on War

"I would recommend to those who are shaping the program for war, as a preliminary to all else, a great and far-reaching campaign of information to make the people understand this war. The schoolrooms, the lecture halls, the churches, the libraries, the city halls, the public squares and the movies—all the meeting places of the people in every State of the Union should resound with the voices of America's greatest and most forceful speakers, telling the people—and all of the people—the simple truth, the basic facts about this war.

"This campaign should be conducted on the same scale as if it were a presidential campaign, only the two parties, instead of flooding the country with information about the virtues of one side and the defects of the other, would be joined together in spreading all the facts about the war which it is so essential for the people to know.

"And these war facts, when told to the people, should be printed in every newspaper in the land, and should be distributed as leaflets to every household in every city and town and village of the Central and Western States.

"Tell the story of how the war began, and the facts that went before.

"Tell the story of Belgium.

"Tell the story of the shooting of Nurse Edith Cavell and Captain Fryatt.

"Tell the story of Rheims Cathedral.

"Tell the shocking story of the Belgian deportations.

"Tell the story of the starving prisoners of war in Germany.

"Tell over again the story of the Lusitania, the Arabic and the Sussex.

"Tell the story of the sinking of the Red Cross hospital ships.

"Tell the story of German machinations in this country since the war began.

"Throw the full light on these and every other phase of the war that will quickly lead the people to understand the kind of enemy we are fighting."



West half of the Coliseum, showing entrance and decorative scheme as it appears from the balcony

Used Car Show a Hit

Chicago Dealers Sell \$46,895 Worth of Cars in 2 Days at Coliseum Exhibit

CHICAGO COLISEUM, May 7—The Great Central Market Used Car Show which opened Saturday vied with the national exhibitions which have been housed in the Coliseum each year as a lure for the dollars of the man who feels he cannot afford a new car, but who wants a real bargain and a machine that looks as much like a new one as possible. The show will continue until May 13. Fifty cars were disposed of Saturday and Sunday, which netted the dealers \$46,895.

Despite the Joffre celebration, the floor of the Coliseum was filled almost to capacity. It was Chicago's first experiment with a used car show; in fact, the first in the United States on any such scale as this, and the visitors were not the kind who visit national shows, try the upholstery, take a booklet and pass along. Visitors to-day pried into the insides of the cars and signed checks. Each car had its bill of health tagged to it.

Just prior to the opening of the show cars of almost every make assembled at Thirtieth Street and Michigan Avenue ready to proceed en masse to the loop as soon as the Joffre-Viviani parade passed down Michigan Avenue to the south. Flag-bedecked and headed by a band, the parade came into the loop, circled and went back south to the Coliseum. Even before the parade returned to the Coliseum and within the first half hour

after the show opened, a Haynes roadster was sold to a Chicago physician. A few minutes later the Schillo Motor Sales Co. found a buyer for a duplicate of the Hupp capital-to-capital car and from then on reported sales were frequent.

About 120 used cars of all descriptions made up the personnel of the first act of the 10-day bill which will be changed three times daily. Figures on the official price tags when the show opened ranged from \$375 for a Maxwell to \$4,300 for an elaborately-equipped Pierce-Arrow. However, most of the cars were priced from \$500 to \$900. Three times each day the sold cars will be removed from the floor and others rolled in to take their places. Nearly 700 cars have been appraised and certificated by a technical committee and are ready to be brought into the Coliseum as rapidly as there is a vacant space and put on sale.

Every car entered bears three official tags on its radiator, outlining its pedigree and specifications in detail and testifying as to its having been examined and tested by the committee. Touring models are in the majority to-day, but there are many limousines and roadsters. Few of the offerings are more than three years old.

Decorations are on an elaborate scale running to green, white and American flags. The entire ceiling of the Coliseum is hung with flags. Exhibits have a back-

ground that resembles a gate with two pillars on top of which are potted plants. There is a lattice for a short distance each side of the pillars and then a solid, four-panel, gate-like section. Each exhibitor has two such spaces and the divisions along the aisle are miniature sections of the pillars at the back, these, too, being topped with potted plants. The booth divisions are yellow and white.

Until late in the evening the crowd continued to come in quest of bargains. Even the oldest salesmen and dealers on the row could not remember a time when there has been a more thoroughly buying crowd, and in this respect it appears the local used car show will outshine the national event, where there are so many who go from the desire to see the new models.

The idea of one price, marked in plain figures by the appraisal committee, seemed popular with the crowd from the start. The display of electrics is good and seemed to attract considerable attention among feminine visitors.

There are twenty-nine accessory exhibits around the outer edge of the Coliseum. One of the most novel of these is that of the Motor Salvage Co., Chicago, which dismantles cars and sells the parts. Each day a car will be torn down and it is expected this will interest a great many of the visitors.



Process room at the Detroit plant of the Parker Rust-Proof Co., with the tanks shown in the background

Parker Rust-Proofing

Process Now on Commercial Basis—Comprises Four Steps: Cleaning, Processing, Drying and Oil Dipping

PARKER rust-proofing is now on a commercial basis in the Detroit plant—the first of twenty-five to be erected in the principal cities of the country. A great many of the automobile companies have installed their own plants to do this work, and the Detroit factory of the Parker Rust-Proof Co. of America is designed to meet the needs of those who have not made their own installations.

The Parker process is entirely a chemical one in which the ferrous metals are immersed in a chemical bath, heated to a temperature of 212 deg. Fahr. The basic chemicals in the bath are phosphoric acid and manganese dioxide, together with other chemicals in composition. The bath in which the metals are immersed is 98 per cent water.

Four Steps in Process

The procedure of treating iron or steel parts with the Parker process may be divided into four steps as follows: first, cleaning; second, processing; third, drying, and fourth, oil dipping. Before treatment in the chemical bath the parts should be freed from oil, grease or scale coatings of any sort. The cleaning of complete machined parts may be accomplished by dipping in gasoline. Rough castings and certain metal stampings can be pickled with Parco compound or sand blasted so as to break the outer scale or oxidized surface. Parts subjected to the pickle or sand blast require no subsequent cleaning in gasoline.

The parts to be rust-proofed are first given a sand blasting to remove rust and scale. The plant has a complete sand-blasting installation both for machine and hand work. This takes off all the scale and leaves the surface of the material in proper condition to take the bath.

After cleaning, the parts are placed in perforated or mesh buckets or trays, depending upon the size and ease with which they can be handled, and are then immersed in the acidulous process bath, in which the solution has been raised to the boiling temperature of 212 deg. and allowed to remain until the impurities are completely removed from the surface of the

metal, and they are given a rust-proof skin which is actually part of the metal itself. The process takes from $\frac{1}{2}$ to 3 hr., depending on the size of the part and the amount of impurities in the metal.

When the materials are put into the bath there is a brisk chemical reaction. Then, through an effort to establish an equilibrium, characteristic of all chemical actions, there is a gradual increase of resistance in the metal due to deposits of an insoluble upper base of phosphate of iron. This resistance goes on until action ceases and the result is an adhesive homogeneous penetrated surface that effectually stops chemical action not only in the bath but also when exposed to air. The articles, after being removed from the process tank, are left to dry. A drying oven at a temperature of about 150 to 200 deg. can be used to quicken this operation.

After the articles have been dried they are then immersed in an oil bath (Parkerol), a special formula for this purpose. The articles are immersed but an instant to cover them with oil, then are placed on a drain board or separator. The effect of the oil is to neutralize the action of the process, thus completing the chemical action and making the process permanent.

This process is distinctive from a coating process in that the treatment is not applied to the surface, but is actually part of the metal.

Gives Adhesive Surface

One of the features of the treated metal parts is the ability of the surface to advantageously take japan, varnish or paint. When removed from the bath and finally treated with the oil, the finish is gunmetal, and with a microscope the surface will be seen to have taken on an etched character, which is doubtless responsible for its ability to retain applied finishes.

The Detroit plant, which has been recently finished and which is now doing work on a large scale, has a capacity of 200 tons per day. It is made up of a main processing building, 60 by 350 ft., in which the dipping is carried out,

and an enameling, painting, and tank building department in a structure 60 by 300 ft., and a powerhouse, 60 by 160 ft. In the processing room are four tanks, one 7 ft. wide by 28 ft. long and 20 ft. deep, which has a capacity of approximately 20,000 gal., and which is the largest tank installed. The other three tanks are capable of holding about 3000 gal. each. When the local plant is completed, it will have thirteen tanks giving a total capacity of 50,000 gal. The tanks are steel lined with wood exterior, and are arranged with double compartments to eliminate sediment. The construction of these tanks is patented.

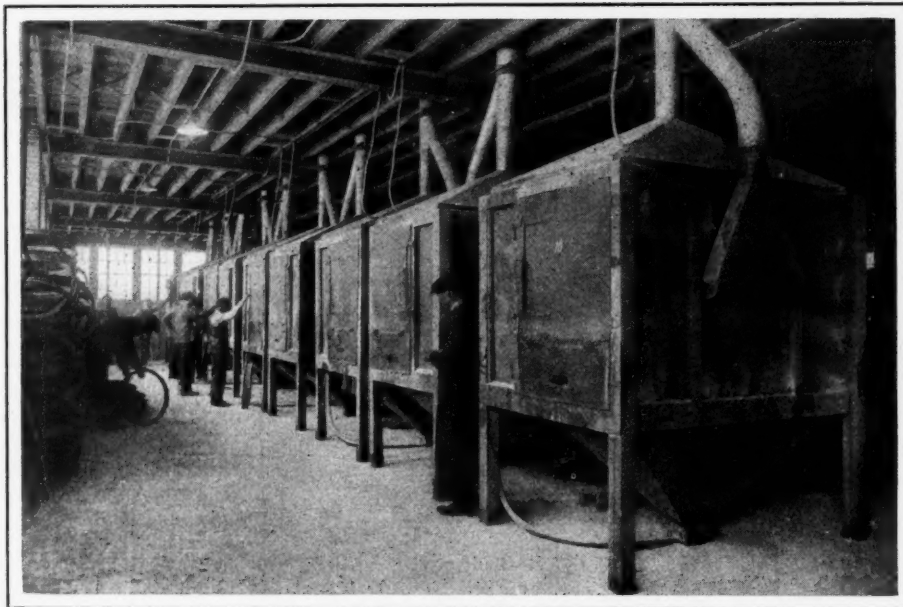
In rust-proofing small parts they are placed in metallic baskets, or hung on suitable racks. When the dipping process is complete, the small parts are placed on metal racks and dried before being placed in the oil. The small parts which are in the baskets are run through an oiling machine which treats them all at once. When the plant is completed, automatic machines will be used to handle the cleaning and oiling, so that by means of a continuous conveyor arrangement it will be possible to sand blast, process, and oil the parts continuously and with a maximum efficiency. It is estimated that with the equipment running in this way it will be possible to rust-proof from 4000 to 5000 automobile rims in one day with five men.

Sand Blast Barrels

In the sand-blasting department everything that can be handled automatically in barrels is put through in that way. The small parts that cannot be treated by the barrel system are cleaned in hand sand-blast booths which have curtain doors through which the operator handles his sand-blast jet. The operator, of course, has the familiar sand-blast helmet in which he works. When the plant is complete there will be fourteen of these hand sand-blast booths in use.

The barrels for cleaning the larger parts are of various makes, one being Pangborn, two New Haven, and the fourth, a Wadsworth barrel. For large parts which exceed the capacity of the barrels there is a sand-blast room, 8 ft. wide and 30 ft. long, equipped with four Pangborn dust arresters in which any large work coming into the plant can be handled.

When the plant is altogether complete, there will be a total compressed air supply available of 4000 cu. ft. per minute. At the present time the capacity is 2000 cu. ft. per minute, supplied by three Ingersoll-Rand two stage compressors. The remaining 2000 cu. ft. capacity will be made available by an additional large compressor having that rating. The compressors are driven by Bruce-Macbeth gas engines, and there is also an engine for driving a generator to supply the electric light. To take care of additional compressors, etc., a 500



Row of sand blast booths at the Parker Rust-Proof Co.'s plant in Detroit

hp. gas engine is to be installed and another having a capacity of 150 hp. The water from the cooling jackets of this engine is utilized for heating the buildings.

While the Parker rust-proofing process is suitable for a great many industries, it has a particular field in automobile construction. One of the particular uses to which it has been successfully put is in the rust-proofing of automobile rims. Another great field for it in automobile work is the replacement of non-ferrous metal parts by malleable and gray iron castings or steel stampings. These parts when rust-proofed can take the place of brass, aluminum, copper, etc. Instances of where this can be and, in fact, is being successfully used in replacing other metals are carbureters and water pumps. Among the carbureter companies using ferrous metal with the Parker rust-proofing process are Carter, Bryne-Kingston and Marvel.

In addition to the twenty-five plants which are to be put up, the process is licensed to manufacturers who desire to operate their own rust-proofing departments. Concerns in the automobile and allied industries which are using the Parker rust-proofing process on various parts are: Packard, Chalmers, Hudson, Saxon, Hupp, Paige, Anderson Electric, B. F. Goodrich and Michigan Lubricator.

The Electric Vehicle and the War

WITH the advent of the great war the electric vehicle was given a splendid opportunity to prove its dependability, economy, and its adaptability to all sorts of passenger, commercial and municipal uses. In 1914, at the beginning of the war, there were only 150 electric vehicles in use in England,

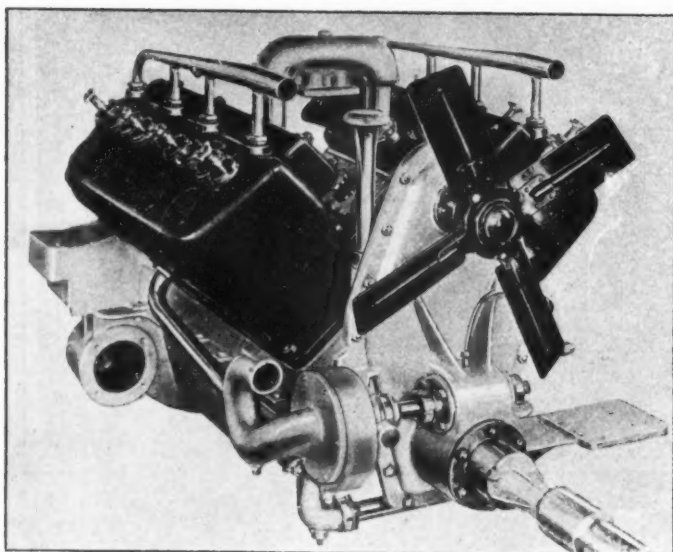
and has increased in 2½ years to 858, which is nearly six times the number of electrics which had been put into use in England during the 10 years previous to the war, according to A. Jackson Marshall, secretary Electric Vehicle Section of the N. E. L. A.

Since both Germany and Austria have been cut off from the world's supply of petroleum, and because electric current is unusually cheap, due to the abundance of coal the Germans are mining from the territory in France which they hold, the use of electric vehicles in these countries has been greatly augmented during the last 2 years. The worth of electric trucks is plainly evident when it is realized that 10,000 of them would release 40,000 men, or nearly two full army divisions.



Piling of rims which have been through the Parker rust-proof process and some pieces of souvenir artillery which have been rust-proofed

Three Herschell-Spillman Engines



Eight-cylinder Herschell-Spillman 3 by 5-in. engine. This is also made with a bore of $3\frac{1}{4}$ in.

THREE engines, an eight, a six, and a four, are provided by the Herschell-Spillman Co., North Tonawanda, N. Y. This gives a range of power plants which covers a wide field of vehicles and is designed to meet the needs of assembled car manufacturers desiring to use standard stock parts.

The eight-cylinder engine, known as Model V, has its cylinders cast in two blocks from semi-steel. The inlet pipes are cast integral with the cylinders and the exhaust pipes are separate and bolted on. One of the features of the cylinder casting used in this engine is the ample water space. The water enters the cylinders at the lowest point and emerges directly over each exhaust valve. The crankcase casting is made from aluminum alloy, having stiffening provisions in the way of ribs and bracings. The standard S. A. E. bell housing is cast integrally with the crankcase. The oil pan is also aluminum alloy and is a separate casting, which can be removed and cleaned by taking out the supporting flange bolts. Two sets of specifications are given for the Model V engine, and these are appended herewith. It will be noted that the bore is furnished in either 3 or $3\frac{1}{4}$ in., and the stroke, 5 in. This gives a formula horsepower rating of 28.8 or 33.8 hp.

The pistons are iron fitted with three $\frac{3}{16}$ in. rings, all above the wristpin. The pin itself is seamless steel tubing, hardened and ground, and it is anchored in the piston by means of a set screw in the piston boss. The connecting-rods are conventional I-beams with two-bolt caps running side by side on the crankpin, this construction being distinct from the more common practice of using a yoke and double concentric bearing in the lower end of the rod. With the side-by-side arrangement of the connecting-rods it is necessary to stagger the cylinder blocks $1\frac{9}{16}$ in. or an amount corresponding to the width of the big end connecting-rod bearing. These rods are made from high carbon steel and are drop forgings giving relatively light weight, with maximum stiffness and rigidity, due to the char-

acteristics of the I-beam section. The bearing on the crankpin end is die-cast babbitt riveted to the rod. At the piston pin end the bearing is a phosphor bronze bushing, pressed into the connecting-rod.

The crankshaft is carried on three main bearings. It is forged from high carbon steel, machined and ground to size. The bearing sizes are given in the accompanying list of specifications. The camshaft is a low carbon steel forging with the cams integral; it is on the center line of the motor where it can distribute equally the valve drive to each of the cylinders. The valves are conventional 45-deg. bevel seat type, with nickel-steel head welded to carbon steel stems.

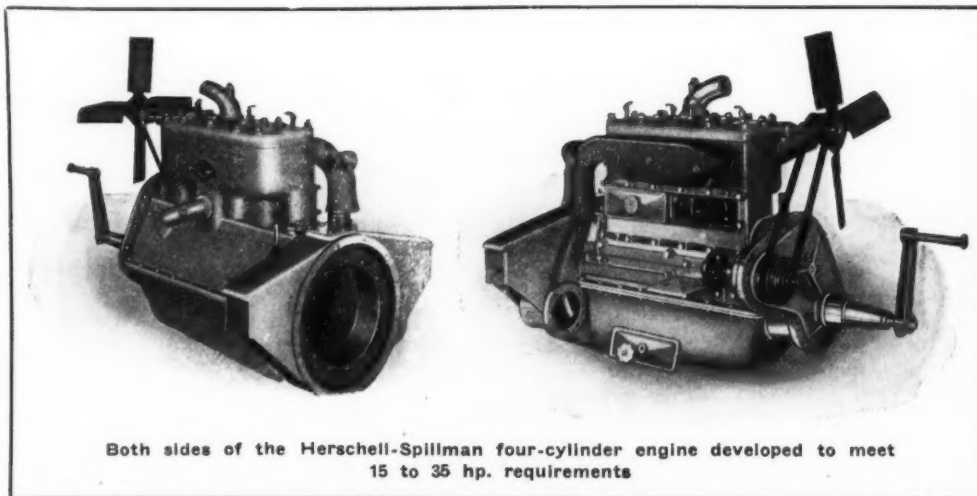
Lubrication is by pressure feed, the oil being drained from the oil pan by a gear pump through a passage extending lengthwise of the case to the crankshaft main bearings under a pressure of from 10 to 50 lb., corresponding to the speed of the engine. From this passage the oil is taken to each of the main bearings and thence through the hollow crankshaft to each connecting-rod bearing. From the lower connecting-rod bearings the oil passes up through tubes in the connecting-rods to the wristpin bearings and cylinder walls. The oil passage in the crankcase is also connected with the three camshaft bearings.

A feature of the oiling system is the adjustable safety valve which is placed in the oil line at the left side of the engine. This maintains the proper pressure in the oil feed and the overflow from it is conducted by a tube to the timing gears. Oil retainers are placed at several points in the crankcase so that a maximum amount is returned to the oil pan to be strained and circulated by the pump.

Cooling by Pump Circulation

Cooling is by pump circulation, with the water pump mounted on the cross shaft and driven by spiral gears at the front end of the engine. The pump is of double construction so that circulation is given to each separate cylinder block. The cooling fan is five-bladed and made of pressed steel. It is gear-driven and provided with a friction damper to eliminate the effects of inertia in starting and stopping. Arrangements are made to attach the tire pump to the rear of the fan shaft between the cylinder blocks.

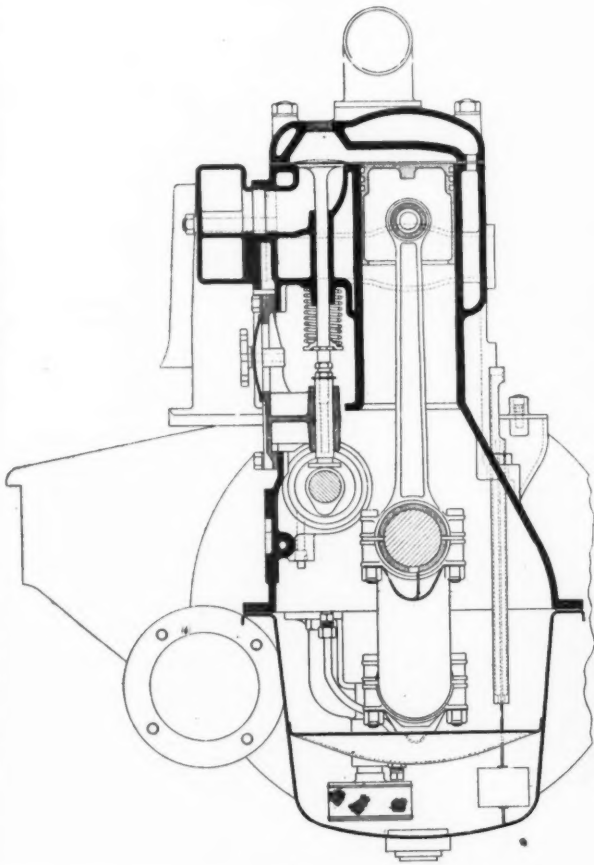
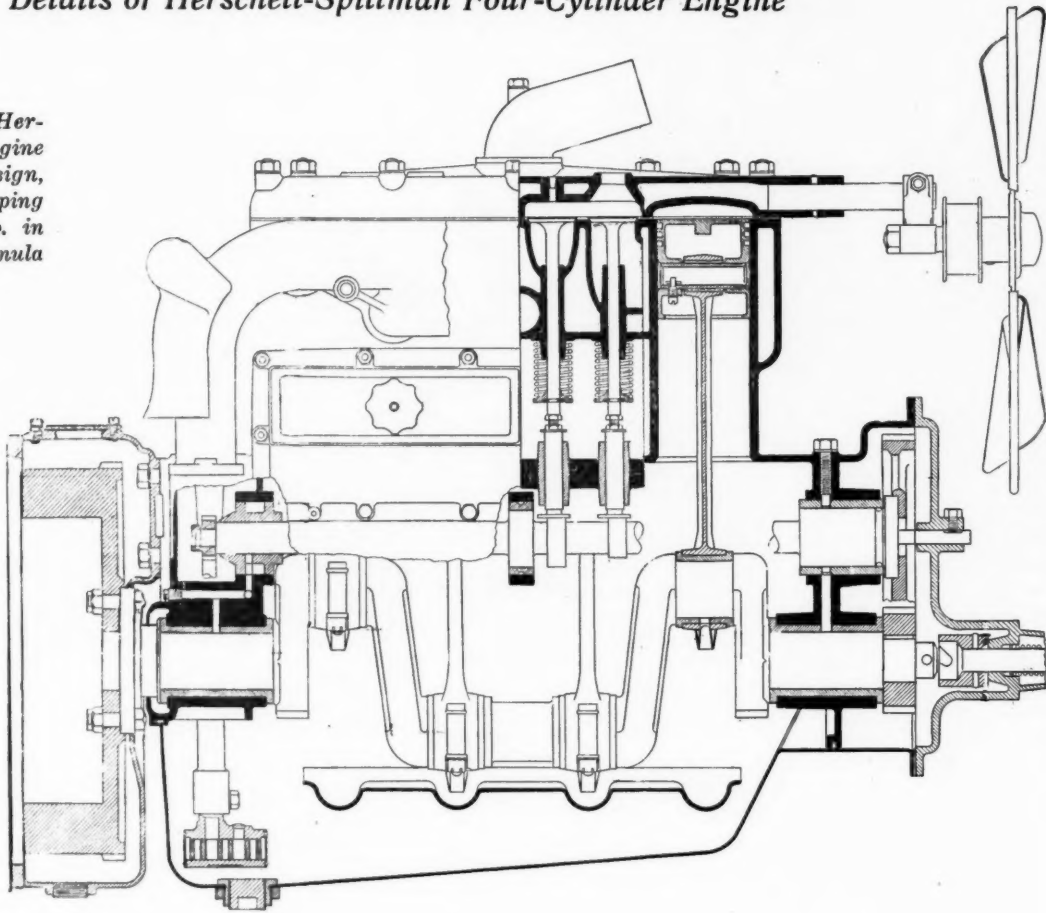
Practically any type of starting motor can be installed on this engine because of provision made for it in the right supporting arm. A bracket is also cast on the front gear case cover for installation of a lighting generator. This is



Both sides of the Herschell-Spillman four-cylinder engine developed to meet 15 to 35 hp. requirements

Details of Herschell-Spillman Four-Cylinder Engine

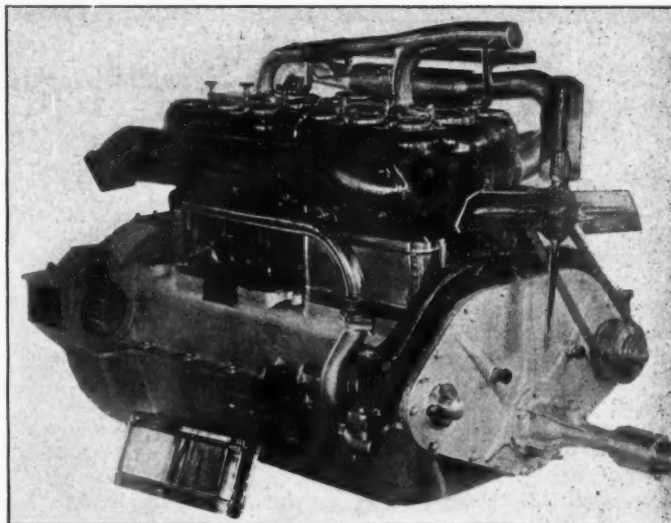
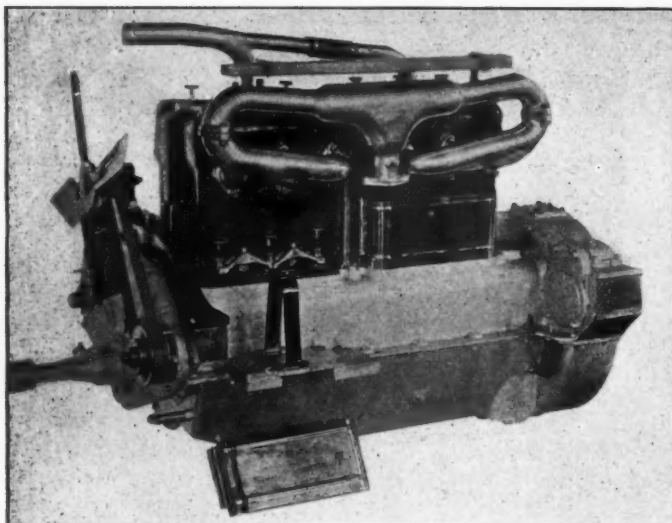
The four-cylinder Herschell-Spillman engine is a high-speed design, $3\frac{1}{4}$ by 5 in., developing from 36 to 38 hp. in brake tests. Formula rating is 16.9.



Specifications of Herschell-Spillman Engines

Model	V*	S-A	I
Number of cylinders..	8	6	4
Bore	3 in.	4	$3\frac{1}{4}$ in.
Stroke	5 in.	$5\frac{1}{2}$ in.	5 in.
S. A. E. rating.....	28.8 hp.	38.4 hp.	16.9
Actual brake pull....	70.0 hp.	100 hp.	37 hp.
Valve—effective diam-			
eter	$1\frac{7}{16}$ in.	$1\frac{7}{8}$ in.	$1\frac{9}{16}$ in.
Valve lift.....	$\frac{3}{8}$ in.	$\frac{5}{16}$ in.	$\frac{5}{16}$ in.
Crankshaft bearing,			
front	2×3 in.	$2\frac{1}{4} \times 3$ in.	2×4 in.
Crankshaft bearing,			
center	2×3 in.	$2\frac{1}{4} \times 2\frac{3}{8}$ in.	None
Crankshaft bearing,			
rear	$2 \times 3\frac{1}{4}$ in.	$2\frac{1}{4} \times 3\frac{1}{4}$ in.	2×4 in.
Camshaft diameter...	$1\frac{1}{4}$ in.	$1\frac{1}{8}$ in.	$1\frac{1}{8}$ in.
Camshaft bearing,			
front	$1\frac{13}{16} \times 3$ in.	$1\frac{11}{16} \times 2\frac{3}{8}$	$2\frac{1}{16} \times 2\frac{3}{8}$
Camshaft bearing,			
center	$1\frac{1}{4} \times 2\frac{1}{2}$ in.	$1\frac{1}{8} \times 2\frac{1}{4}$ in.	$2\frac{1}{32} \times \frac{3}{8}$
Camshaft bearing,			
rear	$1\frac{1}{4} \times 2$ in.	$1\frac{1}{8} \times 2$ in.	$1\frac{1}{8} \times 2\frac{3}{8}$
Connecting-rod length	11 in.	$12\frac{1}{2}$ in.	11 in.
Connecting-rod bear-			
ing, diameter.....	$1\frac{7}{8}$ in.	2 in.	2 in.
Connecting-rod bear-			
ing, length.....	$\frac{19}{16}$ in.	2 in.	2 in.
Piston length.....	$3\frac{1}{2}$ in.	.....	.....
Piston rings, 3 in num-			
ber, width.....	$\frac{3}{16}$ in.	.....	$\frac{3}{16}$ in.
Piston pin bearing....	$\frac{7}{8} \times 1\frac{1}{8}$ in.	$1\frac{1}{8} \times 2\frac{1}{2}$ in.	$\frac{7}{8} \times 3$ in.
Weight	550 lb.	763 lb.	475 lb.

*Model V is also made as V-A with a $3\frac{1}{4}$ -in. bore, giving a rated horsepower of 33.8.



Intake and exhaust sides of the six-cylinder 4 by 5½-in. Herschell-Spillman engine. Some of the features of this power plant are unit construction, three-point suspension and force-feed lubrication

driven through a flexible coupling by the cross shaft which operates the water pump.

The Herschell-Spillman six and four are conventional L-head types with the specifications as given in the accompanying table. The four-cylinder engine is an up-to-date type of high-speed design having a formula rating of 16.9 from its ¾ by 5-in. cylinders, and capable of developing, according to the brake test, from 36 to 38 hp. This is the latest product of the Herschell-Spillman Co. and is a block cast design with the gas and water inlets in the cylinder. The inlet and exhaust manifolds are cast integrally with each other and bolted to the cylinders. The valves are surrounded by water passages, with water passing entirely around each of the cylinders. In this engine the crankcase is cast integrally with the cylinders, with the standard S. A. E. bell housing bolted to the crankcase. The oil pan is a steel stamping bolted to the crankcase and readily removable.

Construction Details

The pistons are cast from gray iron and have three 3/16-in. rings above the wristpin, as in the eight-cylinder engine. The wristpin is of seamless steel tubing, hardened and ground, and is clamped in the piston by means of a set screw. The connecting-rods are high carbon drop forgings of I-beam section, with two-bolt lower bearing caps. The bearings are die-cast babbit on the lower end and phosphor bronze in the piston ends. The crankshaft has two main bearings and the shaft itself is high carbon steel, heat-treated, machined and ground. Low carbon steel is used for the camshaft.

Lubrication is by force feed to the main crankshaft bearings, camshaft and pump shaft. The upper and lower rod bearings and the cylinders are taken care of by splash. An overflow valve is arranged, by means of which oil is led through a tube to the timing gears.

Either magneto or battery may be used for ignition, and cooling is by thermo-syphon. As will be noted, the general characteristics of this engine are very similar to those of the Herschell-Spillman V eight-cylinder engine. The differences in size, etc., are brought out clearly in the tabulation of specifications herewith.

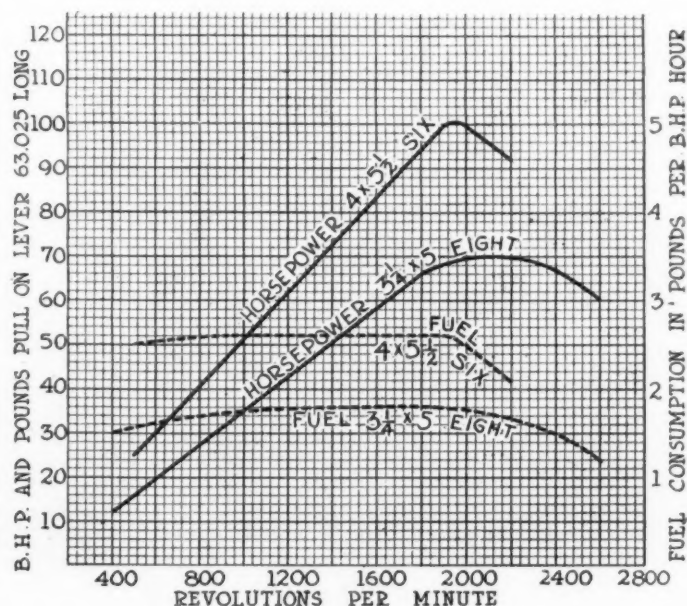
Industrial America Handbook of U. S. A. Firms for Russia

INDUSTRIAL AMERICA, the handbook of industrial, commercial and financial information, including a classified trade directory of American firms for use in Russia, is being prepared in the 1918 edition. American manufacturers who are interested in the Russian field are invited to forward at once to the American-Russian Chamber of Commerce information regarding their firms and their products for listing in the trade directory section. There is no charge for such

listing, the purpose of the directory being to place before Russian purchasers the most complete and comprehensive list possible of responsible American firms who can supply the wants of Russian consumers. Proper forms for supplying information for the trade directory may be had by applying to the American-Russian Chamber of Commerce, Woolworth Building, New York.

To Be Issued Annually

It is planned to make *Industrial America* an annual feature in the movement to establish permanent trade relations between the United States and Russia. The first edition, issued last year, is a book of 528 pages, 7 by 10 in. bound in flexible red leather. It contains a comprehensive survey of industrial, commercial and financial conditions and practices in the United States not hitherto available in Russia and a classified trade directory of approximately 10,000 names. The book is printed entirely in Russian and is circulated entirely among Russian business houses having a direct interest in American affairs and in the purchase of American goods. The 1917 edition will be thoroughly revised and considerably enlarged. It will be printed during the summer and shipped to Russia in time for distribution just before the end of the present year. Information should be forwarded at once.



Horsepower and fuel consumption curve of Herschell-Spillman ¾ by 5-in. eight-cylinder and 4 by 5½-in. six-cylinder engines

Yale Eight Uses Standard Units

Touring Car, Roadster and Speedster Models at \$1,550



Yale eight chassis made by the Saginaw Motor Car Co., including Perkins eight-cylinder engine, Muncie gearbox and Timken axles

ON the Yale eight chassis, the Saginaw Motor Car Co., Saginaw, Mich., is putting out a line of touring cars, roadster and speedster models selling for \$1,550 with standard equipment, and \$100 extra for wire wheels. This is an assembled car made up of standard units, including such well-known parts as the Perkins engine, Muncie transmission, Timken axles, etc.

Unit Power Plant

The eight-cylinder Perkins power plant is the standard V design, 3½ by 4½ in., giving a formula rating of 31.25 hp. Cooling is by the thermo-siphon system in connection with a Long fin tube radiator. It is a unit power plant with the crankcase and transmission castings of aluminum. The crankshaft bearings are 1½ in. diameter and have a length of 2½ in. at the front and 4¼ in. at the rear end of the case. The lower connecting-rod bearings are 1½ by 2½ in. The engine effort is transmitted through a multiple disk clutch to a selective three-speed gearbox. Hotchkiss drive is used with three-quarter elliptic springs. Wood wheels are used having twelve spokes, 1½ in. diameter. The rims are the Firestone demountable type fitted with 34 by 4-in. non-skid Goodrich tires on the rear and plain tread Goodrich in front.

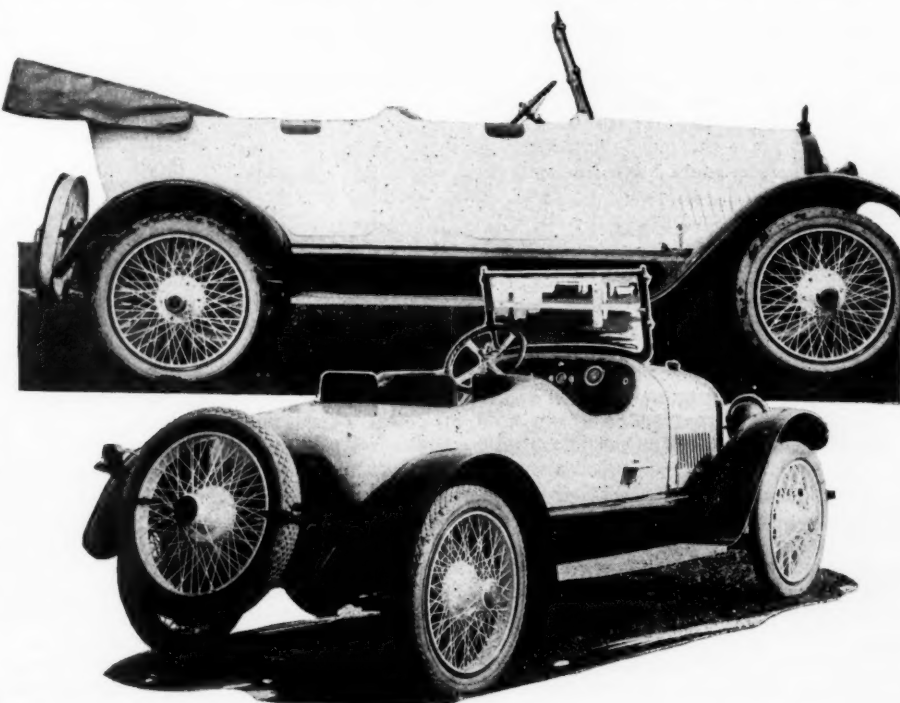
Carburetion is supplied by the Zenith duplex instrument and ignition by the Remy system. For lighting and starting there is a two-unit, 6-volt system, used in connection with a Willard 130-amp.-hr. storage battery. The steering gear is a Lavine, carrying the spark and throttle control on the top of the 18-in. corrugated steering wheel. This has an aluminum spider with the electric horn button in the center of the wheel. The wheelbase is 126 in.

Body Design a Feature

The body design is one of the features of the car. The touring model has a seven-passenger capacity with auxiliary seats in the tonneau folding into the

back of the front seats. There are pockets in all four doors, with genuine leather upholstery.

The speedster model has no doors, but a step on the side of the body instead. There are two auxiliary seats behind the driving compartment which fold into the rear deck. There is also a two-passenger roadster which is on the same general lines as the speedster, except that it is fitted with doors and a top. It does not carry the extra seats. The touring car can be supplied with a permanent top for \$50 extra. The standard colors are white and black or Yale blue and black, this being optional. The equipment includes full set of lamps, Stewart-Warner horn, 15-deg. windshield, Neverleek one-man type top, ammeter, and the usual set of tools.



Upper—Touring model of the Yale eight car, showing center cowl and sloping windshield. It sells for \$1,650 with wire wheels

Lower—Yale eight speedster model, showing the two auxiliary seats and the side step

Fan Is Important Cooling Factor—III

Demand Made for Noiseless Fans—Method of Conducting Fan Tests—Behavior of Belt Drive—Use of Pitot Tube

By A. K. Schanze

Pittier Fan Co.

Third installment of a paper read by Mr. Schanze before the Cleveland Section of the S. A. E.

FOLLOWING immediately in the trail of power consumption at high speeds comes the objection to the noise made at those same speeds. In fan practice, both in the ventilating trade and in the automobile trade, it has been pretty well proved that all fans become noisy when their tip speeds exceed 5000 ft. per minute. At any speed beyond that point there is bound to be noise, and to a more or less marked degree, and the noise increases with the speed.

When a car is racing at 35 or 45 m.p.h. the parties driving are too busy to notice the objectionable noises, but when the same car rolls down a smooth city boulevard at 20 m.p.h. and all of the other mechanisms are practically noiseless, it is somewhat incongruous to have a little 2 or 3-lb. fan making all the fuss.

The demand on the part of engineers who build our standard cars is daily becoming more insistent for less noise from the direction of the fan. The only way for this demand to be met is to bring the fan speeds down to somewhere within reasonable limits, and thus cause improvements in several directions, some of which are mentioned further on.

The apparent obstacles in the way of a successful meeting of this demand is the fact that, generally speaking, fans in use to-day will not deliver much air until they are buzzing at tip speeds around 10,000 ft. per minute. It is to be hoped that the automobile engineers will become more insistent and make fan builders produce fans that will do better.

Another objection to high speeds is the effect on the bearings. To the manufacturer of good ball and roller bearings, the mention of 3000 or 4000 r.p.m. carries no terrors. Still, conditions on an automobile that travels all kinds of roads are very different from and much more severe than conditions that obtain on a stationary machine operating in a dust-proof housing in some building. Among the many complaints that find their way to the fan manufacturer's door, those concerning bearings are the most irritating. In large measure, however, the fan builders have themselves to blame for the complaints, as the high speeds of fans under automobile conditions are almost enough to discourage any bearing.

Belt Drive

Last but not least, the drive comes in for its share of abuse, resultant from excessive speeds. Belts of the very best quality are put on cars and in a short time come out looking like rags, or they begin to stretch and keep on stretching until they have to be cut and shortened or altogether discarded, and new ones substituted. The application of power through a belt is precisely the same as though that belt were placed in a testing machine and subjected to an equivalent lineal pull. In addition there is the heating element due to the friction of grip and slip. If a belt is supposed to do 1-hp. work it should not be applied to a 4 or 5-hp. job. Conditions that govern belt dimensions, however, are such that it is rarely that more than 1½ in. can be allowed on passenger cars and in the great majority of cases the dimensions are under 1 in. Therefore the fan speed must be so regulated as to keep inside the limit set by belt possibilities. Whether or not such a thing as centrifugal force exists in short center belt drives is still more or less a matter of speculation. From some things the writer has had occasion to notice during high speed motor tests on dynamometer set ups, it would seem that there is such a force. The behavior of belt drives in general

practice in factories shows that the working or pulling span of the belt lies as a tangent to the two pulleys while the other span sags into somewhat of a catenary. On short center automobile work, where the centers are almost in a vertical line, several cases have been observed where the belts bulged very decidedly away from the line of centers, and as this condition increased, the slip increased.

This is clearly a case where centrifugal force is overcoming not only sag but the pull on the working span as well. Only at very high fan speeds (over 4000 r.p.m.) was this observed to have taken place and then with new heavy belts. The destructive effect as well as the inefficient application of power must be enormous.

Everything tends to point to a marked necessity to reduce the fan speed; wear on bearings and belts, noiseless operation and most of all, conservation of power demand that fans that can deliver the air at lower speeds be produced.

In short, use better fans.

Bearings

Under this subject heading have come so many irritating complaints that it is with many misgivings that the subject is being taken up. Fundamentally, the fan manufacturer can shoulder the blame for faulty bearings off onto the bearing maker, but it is hardly fitting and proper for the maker of any assembled article to try to make his customer believe that what some other concern is furnishing is not up to requirements. When the fan builder delivers the fan to his customer he accepts the full responsibility for the detailed correctness of its performance.

Bearings are of several distinct designs; there is the plain iron or steel bearing similar to an ordinary wagon wheel on its axle. There is the bronze bushing on the steel spindle. There is the cup and cone ball bearing. There is the roller bearing, and finally there is the annular bearing.

Upon one point only in the bearing question can the manufacturer justly hinge an alibi and that is on the question of price. Car builders cannot or will not pay the price necessary to get them what they really should have.

The iron hub or steel spindle bearing satisfies the demand for a low priced bearing. It gives satisfaction of a certain kind, but it is subject to and does have so many troubles that it really should not be used. Car owners do not carry all of their troubles back to the car manufacturers, especially after they have owned a car for a year or more, but garage men can tell many stories about removing a fan and spindle of the kind under consideration, and of pressing the fan off the spindle in a vise, and then turning down the spindle in a lathe, so that it becomes a loose fit in its hub in order to make it proof against seizing again.

The bronze bushing on the steel spindle is ideal enough in its little way, but it costs real money when properly made and has a tendency to let its lubricant run out at both ends and spatter things pretty generally with grease. The saving in cost over one of the types of roller bearings is so little as to make it hardly worth while.

The cup and cone ball bearing have been the most widely used of the so-called "better bearings."

The writer has never been able to comprehend just how this got so much popularity, since its basic principles are wrong for most of our fan applications. For shafts or spindles that present a uniform vertical thrust the balls take the

load in a normal line because their obliquity to the axial line is compensated by the opposition of one set to the other. Such is the case in motorcycle axles and bicycle axles. The belt on fans exerts a heavy downward pull, usually out of the line half way between the cups, and the fan then comes along with a thrust that goes at right angles to the belt pull. The whole arrangement, therefore, seems wrong.

In making the above-mentioned statements to some engineers, the writer has met with some considerable arguments, but the feature that cannot be argued down is that the cup and cone bearings apparently are eternally looking for trouble and meeting with much success in finding it. As a matter of fact, a good cup and cone bearing ought to be the most expensive kind to make, but again the element of reduction in first cost has influenced conditions to a point where the greatest criticism that can be made is on the quality of the materials used.

Annular Bearings

The annular bearing is the ideal for those who are willing to spend the money for quality. With a good annular bearing there is no trouble and good ones can be found. They are noiseless, and reduce friction to a minimum. They are also capable of taking up the thrust without the interposing of thrust washers. The automobile engineer should, however, be very much on the lookout for cheap imitations, as there is a wide difference in quality among the many makes of annular bearings being offered. The best that can be had is none too good, if money is going to be spent in that way at all.

Roller bearings of several types have been offered for fan use. The application of these on fans has been comparatively limited to date, but there will be a decided increase in their use during the next year. One make in particular has been offered which has stood the test of continuous running, and which meets the price qualifications within reasonable limits. It consists of a series of cylindrical spiral steel rollers held in place by two end disc washers. The latter are rigidly held in their planes by small rods that also serve as spacers between the rollers. The whole presents the form of a hollow cylinder 2 in. long. This is placed over a carefully machined steel spindle. Into the pulley hub there is inserted a seamless or split steel sleeve that acts as an outer path for the rollers while the steel spindle is the inner path. Reports on this type of bearing have been highly satisfactory.

Under this heading there is not a great deal to be said that has not been exhaustively worked out already. Grease as a lubricant is very fine, as long as it remains pure grease, but its propensities for picking up grit and concealing it from view are such that it has lost favor with most engineers.

Oil is the proper thing at all times and for fan bearings a light grade of machine oil will give the most satisfactory result.

The Fan as a Whole

Taken, then, as a whole unit, the fan should be given consideration with all the care of any other part of the car. Other parts of the chassis and body should be constructed with a view to letting the fan do its work in the most efficient manner. Assuming now that a fan has been selected, the nature of its application must be studied.

The air intake through the radiator should prevent as little friction as possible; there is a wide difference in this respect. The distance between the fan and the radiator should always be one-half inch.

On the discharge side the fan is always somewhat unfortunate. The cam gear casing usually blanks the lower third of the fan circle. This cannot be helped, apparently, so will have to continue to be borne in silence by the fan manufacturers.

The air "getaway" will bear a lot of improvement and such improvement can be made. A study of the subject has produced the rule that, for best results, the discharge area should exceed the intake area at least 20 per cent. This rule assumes, also, that the discharge space will be in one location and unobstructed. No automobile known to the author of this paper presents such a condition. Moreover, in every car thus far measured, the discharge areas are less than the free radiator supply area.

Spaces under the dash are hard to alter, but the hood presents a good opportunity for plenty of louvers and these

should be figured as the primary means of air escape. Why the car architect objects to louvers is not altogether clear, but their necessity is so great that appearance can well be sacrificed for them.

It must be remembered that the air that gets through a radiator does a whole lot of expanding under the hood. With an inadequate escape area, the static pressure builds up to a point beyond the fan capacity and relieves itself by backing out through the radiator.

To overcome this, shrouds have been placed around fans in some cars. The effect is to increase the air distribution over the face of the radiator front, but they are very inefficient because of the sharp angle they necessarily make with the rear face of the radiator, and furthermore cannot increase the capacity of the fan.

The automobile fan, in its most widely used form, belongs to that type of air handling machine known as the disc fan. In this class belong all fans that take their air supply mainly from an area immediately behind their peripheral circles and discharge it in a direction at right angles to their planes of rotation. The characteristic of the disc fan is that it handles large volumes at very low pressures. The large volume is very valuable for automobile work, but the low pressure is a decided disadvantage. There are some fan engineers now working on designs that produce large volumes at sustained pressures, as the pressure is necessary to drag the air through the radiator resistance. The multiblade fan, so far as is known, comes nearest to maintaining a pressure than any of the other types. Improvements are being made right along in its design, and the indications are that it can be converted into a real pressure fan without sacrificing its high efficiency.

Finally, there are great economic possibilities in a good fan. When the cooling system has been worked out to its maximum efficiency the fan will be found to take the place of much excessive radiation. Fans are much cheaper than radiator core depths. An improvement in the fan makes it possible to eliminate some of the radiator. Assuming that a 3½-in. core is being used and to this is applied a fan that doubles the air velocity over present conditions, there is the possibility of reducing the core depth by at least 1 in. Suppose this is then done and the fan tested. It will be found that the air velocity is greater than it was through the deep radiator because the friction has been reduced. Thus the fan has done even more than balanced off the reduction in core; it has added its own factor of safety.

Car Motion

The statement has frequently been made that when a fan is capable of drawing air through a radiator at a velocity of 2640 ft. per min. (30 m.p.h.) and the car moves at the rate of 30 m.p.h., the value of the fan becomes practically zero, because the car motion virtually neutralizes the fan action.

The answer to this statement is that the same elements that will reduce the free air moving capacity of a fan from 6000 ft. per min. in free air to 2640 ft. per min. through a radiator, will also reduce the air velocity produced by car motion a corresponding amount. The net practical result of car motion, then, is to assist the fan by giving the air an initial impulse, or otherwise stated it relieves the fan of some of the radiator friction load, thereby enabling it to handle more air.

With practically every different make of motor a different phase of the fan pulley presents itself. Many pulleys in use are too small in diameter. While theoretically pulley diameter has no effect whatever on power delivery, it does have a material effect on belt slip, and consequently upon fan speed. Much fan trouble arises from this cause.

The experience of belt makers tends to prove that a pulley should never be of a diameter less than thirty times the thickness of the belt. This is practically out of the question in most automobile designs as it would necessitate a 4-in. fan pulley in most cases. However, the fault of going to the other extreme, that of using a pulley 1½ to 2 in. in diameter, should be corrected, and must be before the automobile manufacturers can feel assured of getting the designed performance out of their fans. A minimum diameter of 3 in. is earnestly recommended.

Much remains to be done toward the selection of a belt and from the results of some recent reports it appears that there are some types of V belts that are giving superior service.

In this connection, let it be noted that some recent experiments conducted by the writer demonstrated that with a 1-in. flat belt a 15-in. fan could not be driven at a speed greater than 3200 r.p.m. without a large percentage (over 30 per cent) of slip, which latter soon proved destructive to the belt.

Use of the Pitot Tube

It is important to note the following rules and be governed by them in the handling of the tube for accurate results.

Examine the points at frequent intervals to insure their being always in good condition.

Always be sure that the rubber hose lines leading to the draft gage are free from kinks.

The dynamic point must always point directly into the advancing fluid current in order to register correct readings. If a reading taken with tube in one position as to angularity varies with a reading taken in the same location but with tube at a different angle, it is evident that, in one of the two cases, the dynamic point was not facing directly into the current.

The maximum steady registration on the draft gage is the correct reading for that particular location in the fluid current.

The readings on draft gages are generally reduced to inches of water by calibrations made by the makers of the instruments.

The formula and its derivation for converting inches of water into velocity in feet per minute follow:

V = velocity in feet per minute.

P = pressure in inches of water.

$$V = 4095 \sqrt{P}$$

The atmospheric column = 29,600 ft. = 14.7 lbs. per sq. in.

Law of gravity: $v^2 = 2gh$

v = velocity in feet per second.

g = acceleration = 32.16 ft. per sec.

h = head in feet.

1 cu. ft. water = 62.3 lbs.

1 cu. ft. air = .0715 lb.

1 in. of water head = .036 lb. per square inch.

∴ 1 in. of water head = 72.5 ft. atmospheric head.

for 1 in. water $v = 8.02 \sqrt{72.5} = 68.25$ ft. per sec.

$60 \times 68.25 = 4095$ ft. per min.

$$\therefore V = 4095 \sqrt{P}$$

Up to the present time, the automobile engineers have been so busy with the other more complicated phases of their development work that few have had the opportunity of familiarizing themselves with the rather whimsical behavior of air and fans. Consequently there is such a diversity of opinion as to what shall be done to test a fan properly that much time is lost and the results obtained are not always satisfactory either to the engineer or the fan manufacturer.

As there is nothing to indicate that the Society of Automobile Engineers has ever adopted a standard method of conducting fan tests, the writer takes the liberty of offering the following method for your consideration:

Method of Conducting Fan Tests

Test No. 1. Place the fan on the shaft of a sensitive dynamometer equipped with the means of reading speed and power consumption. The fan should be at least a full diameter away from any obstructions in its rear, should have a 10-ft. clear discharge space ahead, and should have at least a quarter diameter clearance between the table or bench and its peripheral circle. In front of the fan, at a distance of from 3 to 6 in. clear of the blades, a light wire frame of small squares should be placed so as to divide the area into any desired number of parts for purposes of uniformity in air delivery readings.

The fan should then be run at speeds of from 500 to 4500 r.p.m., and the air delivery and power consumption recorded for each speed.

Many engineers use the anemometer for measuring air velocity, but experience has shown that this instrument is not reliable for registering the high velocities at the face of a disc fan. It is subject to practically imperceptible, though serious, damage during tests and thus may give rise to erroneous conclusions.

The Pitot tube is by far the most accurate instrument for

measuring fluid motion, and is sensitive to low velocities as well as high. Furthermore, it cannot readily be damaged without having that damage immediately noticeable to the observer, consequently the accuracy of its readings can be relied upon.

In a test conducted as above described, the results will be a free air calibration of the fans tested and thus furnish a standard against which further tests under other conditions can be compared and checked.

Test No. 2. Attach the gas engine whose cooling is to be tested to a high power dynamometer. Attach the fan to the motor in its standard manner and also set up a radiator, properly connected. Put in place the hood, sod pans, etc., so that the entire set-up will resemble the forward part of the car.

Place laboratory thermometers in such a way that the following temperatures can be recorded:

Temperature of air in room.

Temperature of air entering radiator.

Temperature of air leaving radiator.

Temperature of water in top of radiator.

Temperature of water entering jacket.

Also secure a method of keeping an accurate check on the revolutions made by the fan. This is very important.

Run the motor under light load, over a range of speeds equaling the travel of a car at rates of from 15 m.p.h. to 50 or 60 m.p.h. Six or seven such speeds will usually suffice. At each speed take a set of readings in front of the radiator for air velocity through the radiator. It will be found a convenience and an aid to accuracy to divide the radiator into about sixteen squares by chalk marks.

Temperature readings can be taken during all these runs, but are not necessary as their function is completely covered in the next test here following.

By this process a complete record of air delivery through a radiator is obtained. It should be noted here that this method of test throws the entire burden of air delivery upon the fan, as no assistance is derived from forward motion of the car or from wind.

Test No. 3. With all apparatus set up as for Test No. 2, select speed, load and conditions of spark and throttle levers at which heating may be looked for. Impose these conditions and take temperature observations at intervals of about two minutes. Continue this kind of running until boiling is reached or until a uniform water temperature in the top of the radiator is noted for ten or twelve minutes. The fan speed should be constantly checked for slip of belt.

Road Tests

Test No. 4. Road tests may finally be run to check out all results against those obtained in the laboratory. It will be found difficult, however, to obtain conditions fit for such test running over public highways generally, owing to the speed laws, other vehicles on the road and the general poor condition of roads over a long stretch. If a good road, up a hill, can be found, excellent data should be obtainable.

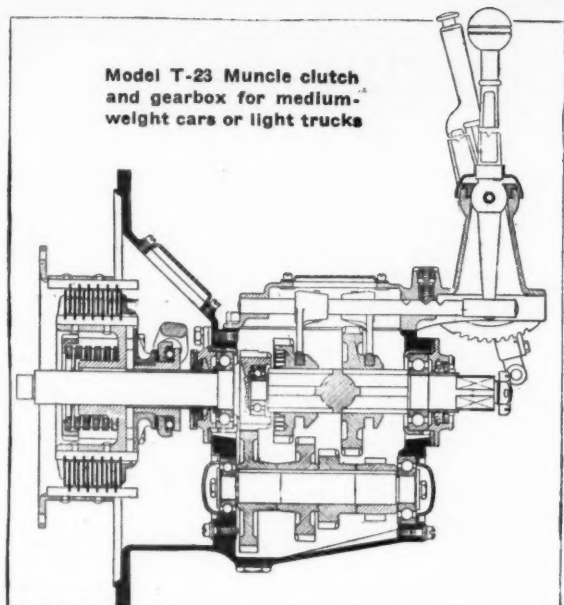
A positive and reliable revolution counter should be placed on the fan so that the same checks may be had as in the laboratory tests. This is even more important than indoors, as the car motion over the rough spots will be found to jolt the fan bracket loose at times. A thermometer (not a motometer) should be secured in the filler cap of the radiator, and a thermometer should be lashed to the frame work of the car body to register atmospheric temperature. Temperatures of the other parts of the cooling system cannot be obtained in road tests without resorting to the use of very elaborate apparatus such as magnetic couples and recording thermometers, and even then the results are likely to be erroneous, because of car motion over rough spots.

The two thermometers above mentioned will furnish very good data for proper comparisons.

The spark and throttle arcs should be marked so that the levers may be reset to any positions that were used on a previous run, if desired.

Measured distances at known speeds should then be run and time and temperature records kept.

A full description of all apparatus used, together with the essential dimensions of the engine, the radiator, the fans, the gear ratios, etc., should accompany the report on every test.



Muncie Gearsets in Six Models

Four Three-Speed Designs and Two Four-Speed Types Cover Entire Field

MUNCIE TRANSMISSION GEAR RATIOS

Model	First	Second	Third	Fourth	Reverse
T-25	2.5 to 1	1.7 to 1	1 to 1	.....	3.4 to 1
T-23	2.77 to 1	1.66 to 1	1 to 1	.....	3.6 to 1
T-31	2.77 to 1	1.66 to 1	1 to 1	.....	3.6 to 1
T-33	2.7 to 1	1.6 to 1	1 to 1	.....	3.6 to 1
T-63	3.6 to 1	2.07 to 1	1.32 to 1	1 to 1	3.9 to 1
T-66	5.1 to 1	2.99 to 1	1.8 to 1	1 to 1	6.1 to 1

GEARBOXES made by the Muncie Gear Works, Muncie, Ind., include both three and four-speed selective designs. The three-speed models are known as T-23, T-25, T-31 and T-33. The four-speed models are T-63 and T-66. This line of units covers the entire field.

The smallest is model T-25, which is intended for light weight passenger cars. It is made with aluminum or gray iron case and in $\frac{5}{8}$ to $\frac{3}{4}$ in. gear face widths. The gears are nickel steel, 6-8 pitch in all of the three-speed units. In the control mounting of the T-25 model the gear shifter lever center is either over the center or at the rear of the gearbox.

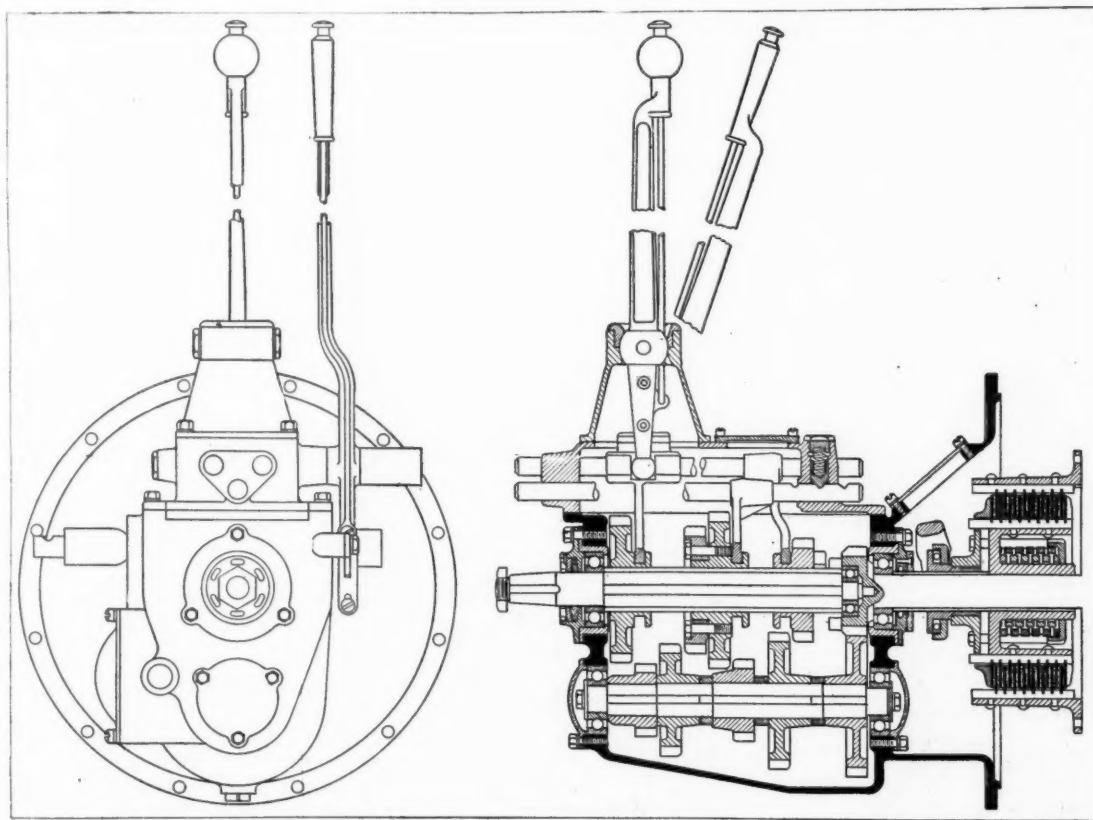
The next larger type is known as T-23. This is intended for medium weight passenger cars or light trucks. It may also be secured in aluminum or gray iron housings. It is quite similar to the T-25 model in general design except that the gear face widths are $\frac{3}{4}$ to $\frac{3}{16}$ in. It has the same type of multiple disk clutch, and the bearings are all annular ball. The T-31 model has about the same capacity as the T-23. The gear face widths are the same and the housings similar. There is a difference, however, in the bearings, which are annular on the main drive shafts but plain on the countershaft.

For heavy passenger cars and light trucks there is the Model T-33, which is also furnished in either aluminum or gray iron cases. This is an all annular bearing job with gear face widths running from $\frac{7}{8}$ to $1\frac{1}{8}$ in. The gears are nickel steel with 6-8 pitch.

The four-speed gearbox is intended for extra heavy passenger cars and

trucks up to and including 3 tons capacity. In the models T-63 and T-66 there is a capacity range up to 5 tons, the latter being recommended for heavy commercial cars. Like other Muncie units, this is made with either an aluminum or a gray iron case. The clutch is a multiple disk on both types, but the bearings are annular on the T-63 and Timken roller on the T-66. The T-63 is intended for unit power plants and is made up with a bell housing. It is a center control unit with the shifter lever mounted on the cover plate of the gearbox, and this is suitable for either right or left drive. On the T-63 model the gears have a 5-pitch and a $\frac{7}{8}$ -in. face. On the T-66 model the gears have a $1\frac{1}{4}$ -in. face width and a 5-7 pitch. The control in this case is on the right side and the unit is adapted for amidship mounting.

The accompanying sectional drawings show models T-23 and T-63. Gear ratios for all models appear in the table.



Model T-63 Muncie four-speed unit intended for extra-heavy passenger cars and trucks up to 3 tons capacity

Automobile Calendar

ASSOCIATIONS AND CLUBS

- May 25—Cleveland, American Automobile Assn., Annual Meeting, Hotel Hollenden.
 June 4-6—Hot Springs, Va., National Assn. of Automobile Accessory Jobbers, Convention.
 Sept. 12-14—Atlantic City, N. J., Motor and Accessory Manufacturers, Mid-Season Meeting.
 Sept. 25-28—Pittsburgh, National Assn. of Purchasing Agents, Convention.

CONTESTS

- May 10—Uniontown, Pa., Speedway Race.
 May 30—Cincinnati, Ohio, 250-Mile Race.
 May 30—Uniontown, Pa., Local Races.
 June 16—Chicago, Ill., Speedway Race.
 June 23—Cincinnati, Ohio, Speedway Race.
 July 4—Omaha, Neb., Speedway Race, Championship.
 July 4—Uniontown, Pa., Speedway Race.
 July 4—Tacoma, Wash., Speedway Race.
 July 4—Visalia, Cal., Road Race.
 July 4—Spokane, Wash., Track Race.
 July 4—Benton Harbor, Mich., Track Race.

- July 14—Rochester, N. Y., Hill-climb.
 July 15—Missoula, Mont., Track Race.
 July 17-19—Buffalo, N. Y., Inter-city Reliability.
 July 22—Anaconda, Mont., Track Race.
 July 29—Great Falls, Mont., Track Race.
 Aug. 5—Billings, Mont., Track Race.
 Aug. 17—Flemington, N. J., Track Race.
 Sept. 3—Uniontown, Pa., Speedway Race.
 Sept. 3—Cincinnati, O., Speedway Race, Championship.
 Sept. 6—Red Bank, N. J., Track Race.
 Sept. 8—Hillclimb, Pike's Peak, for stripped stock chassis.
 Sept. 15—Providence, R. I., Speedway Race, Championship.
 Sept. 22—Allentown, Pa., Track Race.
 Sept. 28—Trenton, N. J., Track Race.
 Sept. 29—New York Speedway Race, Championship.
 Oct. 6—Danbury, Conn., Track Race.
 Oct. 6—Uniontown, Pa., Speedway Race.
 Oct. 13—Richmond, Va., Track Race.
 Oct. 13—Chicago Speedway Race, Championship.

- Oct. 27—New York Speedway Race.

SHOWS

- May 5-13—Chicago, Used Car Show, Coliseum, Chicago Automobile Trade Assn.
 June 20-27—Montreal, Que., Used Car Show, Coliseum, Montreal Automobile Trade Assn.
 Aug. 6-18—Fremont, Neb., General Tractor Demonstration.

- Sept. 2-9—Spokane, Wash., Interstate Fair.

- Sept. 9-15—Milwaukee Show, State Park Fair, West Allis.

- Sept. 9-15—Milwaukee, Wis., Fall Show, Wisconsin State Fair, West Allis, Milwaukee Automobile Dealers.

- Oct. 13-28—Dallas, Tex., Dallas Automobile & Accessory Dealers' Assn. State Fair.

S. A. E. Calendar

Midsummer Meeting

- June 25-26—Washington, D. C.

Standards Division Meetings

MAY

- 22—Lighting, Detroit.
 25—Aeronautic, New York.
 25—Miscellaneous, Detroit.
 29—Research, New York.

JUNE

- 5—Starting Battery, Detroit.
 7—Engine, Detroit.
 8—Transmission, Detroit.

- 14—Electric Vehicle, New York.
 25—Standards Committee, Washington.

Section Meetings

MAY

- 17—Metropolitan Automobile Club of Amer., Engines that Will Burn the Fuels We Shall Have to Use. Papers by H. G. Chatain on the Diesel and P. O. Scott on the Junker.
 18—Cleveland, Some New Phases in the Case Hardening of Steel, by J. H. Heron.
 24—Detroit, Hotel Ponchartrain.
 25—Indiana.

Engineering Calendar

American Railway Master Mechanics' Assn.
 American Institute of Electrical Engineers.
 Master Builders' Assn.
 American Society of Heating and Ventilating Engineers.
 Association Iron and Steel Electrical Engineers.
 Mining and Metallurgical Society of America.
 Society of Automobile Engineers.

MAY

- 12—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
 14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
 15—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
 17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
 17—Mining & Met. Soc. of Amer. monthly meeting New York section at Engrs. Club.
 18—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
 19—Assn. Iron & Steel Elec. Engrs., Fort Pitt Hotel, Pittsburgh. Auspices of Power Committee, W. O. Oschmann, chairman. Power Cost Accounting Systems as Practised by Several Steel Mills in Pittsburgh District.
 21—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
 21-24—Amer. Soc. Mech. Engrs. Spring meeting in Cincinnati. Joint session May 22 with Nat. Mach. Tool Bldrs. Assn.
 29-June 1—Nat. Elec. Light Assn. Convention at Atlantic City.

JUNE

- 2—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
 5-7—Nat. Gas Engine Assn. annual meeting at Chicago (Sherman House).
 8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
 9—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
 11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
 11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Michigan section at Detroit.

- 12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
 13-14-15—Amer. Ry. Master Mech. Assn. convention, Greek Temple, Atlantic City, N. J. Hdqrs. Marlborough-Blenheim Hotel.
 14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
 15—Illum. Eng. Soc. Pittsburgh section, Office Building, Lighting and Inspection Trip through City and County Building. Mr. S. G. Hibben.
 16—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
 18-19-20—Master Car Bldrs. Assn. convention, Greek Temple, Atlantic City, N. J. Hdqrs. Marlborough-Blenheim Hotel.
 20-22—Amer. Inst. Chem. Engrs., Ninth Semi-Annual Meeting at Buffalo.
 21—Mining & Met. Soc. of Amer. New York section monthly meeting at Engrs. Club.
 26-30—Amer. Soc. for Test Mat. annual meeting Atlantic City.

JULY

- 7—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
 9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
 9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
 10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
 12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
 13—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
 14—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
 16—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.

Illuminating Engineering Society.
 National Electric Light Assn.
 National Gas Engine Assn.
 American Society for Testing Materials.
 American Institute of Metals.
 American Foundrymen's Assn.
 Society Naval Architects and Marine Engineers.

- 21—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

AUGUST

- 4—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
 9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
 10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
 11—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
 13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
 13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
 14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
 20—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
 21—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

SEPTEMBER

- 1—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
 8—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
 10-14—Assn. Iron & Steel Elec. Engrs. annual convention at Phila.
 10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
 10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
 11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
 13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
 14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.

- 15—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
 17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
 20—Mining & Met. Soc. of Amer. monthly meeting N. Y. section at Engrs. Club.
 24—Amer. Inst. Metals at Boston.
 24—Amer. Fdry. Assn. annual meeting at Boston.

OCTOBER

- 6—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
 8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
 9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
 10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
 11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
 13—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
 15—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
 17, 18, 19—Amer. Gas. Inst. at Washington, D. C.
 18—Mining & Met. Soc. Amer. monthly meeting New York section Engrs. Club.
 20—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

NOVEMBER

- 3—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
 8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
 9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
 10—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.